REALISTIC®

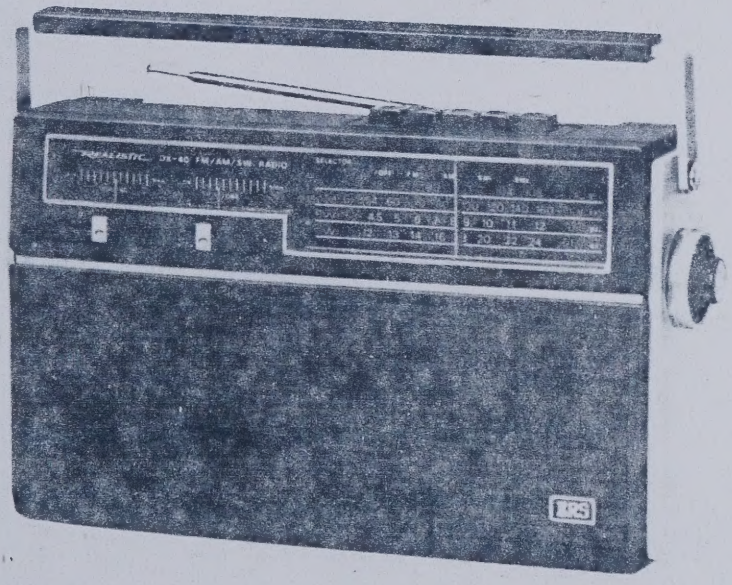
Service Manual

12-775

DX-40

4-BAND PORTABLE RADIO

Catalog Number: 12-775



CUSTOM MANUFACTURED FOR RADIO SHACK A DIVISION OF TANDY CORPORATION

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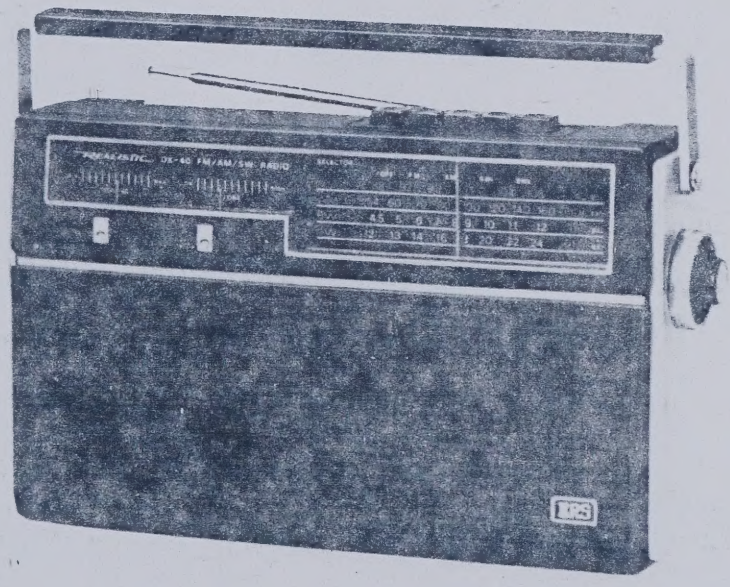

CUSTOM MANUFACTURED FOR RADIO SHACK TC A DIVISION OF TANDY CORPORATION

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1. SPECIFICATIONS

The supply voltage is 6 V ± 0.2 V DC, from a regulated power supply.
The power source must be isolated from other equipment connected to antenna or output.
The room temperature is 25 degrees C.

AM BAND

Speaker impedance: 8 ohms
Output readings are taken across a non-reactive load.
Output reference level is 50 mW total power.
The generator output shall terminate in an IRE loop and loop pointing toward rear of receiver.
Modulation: 400 Hz, 30%

	UNIT	NOMINAL	LIMIT
Frequency Range	kHz	510 – 1650	520 – 1620
IF	kHz	455	± 5
Antenna Sensitivity for reference output power			
at 600 kHz	μV/m	100	200
at 1000 kHz	μV/m	100	200
at 1400 kHz	μV/m	100	200
Antenna Sensitivity for S/N 20 dB			
at 600 kHz	μV/m	280	500
at 1000 kHz	μV/m	280	500
at 1400 kHz	μV/m	280	500
ACA at reference level of 1000 kHz	dB	24	15
AGC figure of merit	dB	45	36
IF rejection at 600 kHz	dB	34	28
Image rejection at 1400 kHz	dB	42	30
Band-width at 6 dB down	kHz	6	4.8
Output, at 10% THD at 1000 kHz 5 mV/m, 1000 Hz, 30% Mod.	mW	400	300
Distortion at reference output at 1000 Hz 30% Mod. at 5 mV/m	%	1.5	5
DC Current drain, no signal	mA	15	25
Whistle modulation of 2nd & 3rd harmonic at 5 mV/m	%	3	15
Dial Calibration at 600 kHz	kHz		± 25
at 1000 kHz	kHz		± 50
at 1600 kHz	kHz		± 75
S/N ratio at 1 mV/m input, 1000 Hz, 30% Mod.	dB	31	26

The oscillator must operate at 600 kHz, with all supply voltages about 4 V DC; an over-voltage of 10% shall not be harmful.

FM BAND

Speaker impedance: 8 ohms
Use resistive load.
Reference output level: 50 mW
Signal generator impedance: 75 ohms
Disconnect telescopic antenna cable.
The signal voltage in this specification or test data is the voltage appearing across the tuner input terminals.
Modulation: 400 Hz, 22.5 kHz deviation

	UNIT	NOMINAL	LIMIT
Frequency Range	MHz	87.5 – 108.5	88 – 108
IF	MHz	10.7	
Sensitivity for 50 mW output			
at 90 MHz	μV	5	10
at 98 MHz	μV	5	10
at 106 MHz	μV	5	10
Sensitivity for 30 dB S/N			
at 90 MHz	μV	7	13
at 98 MHz	μV	7	13
at 106 MHz	μV	7	13
FM Limiting, 3 dB, 22.5 kHz dev.	μV	15	50
IF rejection at 90 MHz, 75 kHz dev.	dB	60	45
Image rejection at 106 MHz S/N 20 dB, 22.5 kHz dev.	dB	30	20
Audio fidelity with tone in high position, 22.5 kHz dev., 1 kHz = 0 dB	Hz	50 – 4000	100 – 3000
ACA 100 μV ± 400 kHz, 75 kHz dev.	dB	15	10
Audio THD, 400 Hz, 75 kHz dev. (1000 μV)	%	1.5	5
Lowest Battery Voltage for operation	V		4
Dial Calibration at 88 MHz	kHz		± 700
at 108 MHz	kHz		± 700
at 100 MHz	kHz		± 700

SW 1 BAND

Speaker impedance: 8 ohms
Output readings are taken across a non-reactive load.
Output reference level is 50 mW total power.
The generator output shall terminate in an IRE loop and loop pointing toward rear of receiver.
Modulation: 400 Hz, 30%

	UNIT	NOMINAL	LIMIT
Frequency Range	MHz	3.8 – 12.5	4 – 12
IF	kHz	455	± 5
Sensitivity for 50 mW output, S/N 6 dB			
at 4.2 MHz	μV	100	150
at 6 MHz	μV	100	150
at 9 MHz	μV	100	150
Sensitivity for 20 dB S/N			
at 4.2 MHz	μV	200	400
at 6 MHz	μV	200	400
at 9 MHz	μV	200	400

Image rejection at 9 MHz	dB	20	16
Dial Calibration at 4 MHz	kHz		± 300
at 9 MHz	kHz		± 300

The oscillator must operate at 4.2 MHz with all supply voltages above 4 V DC; an over-voltage of 10% shall not be harmful.

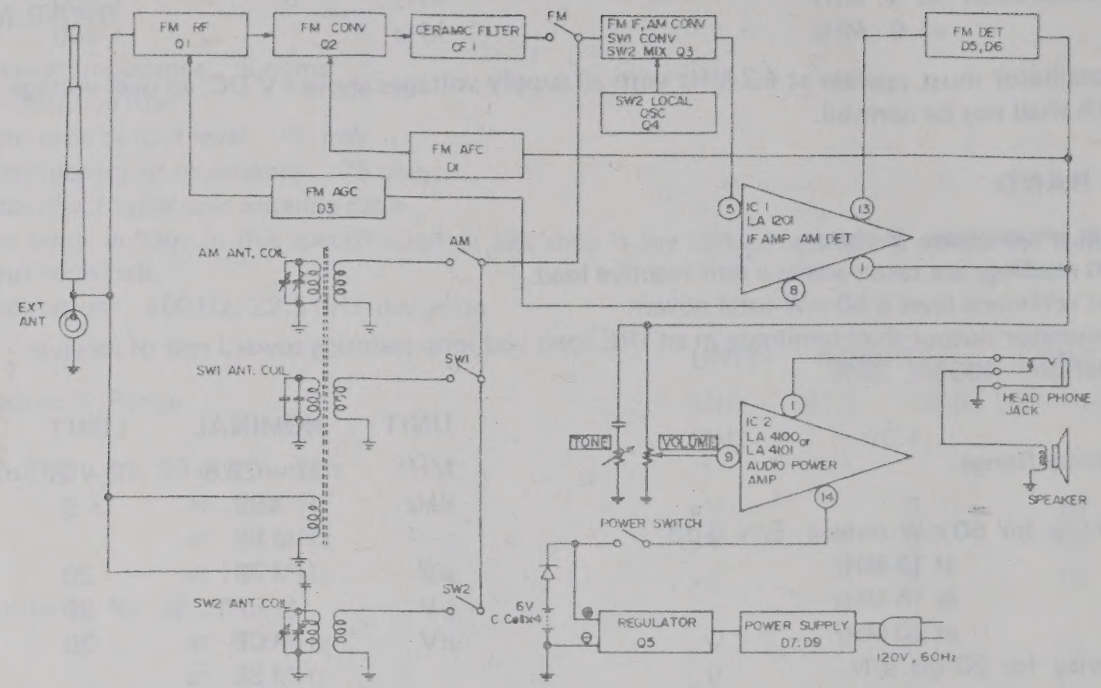
SW 2 BAND

Speaker impedance: 8 ohms
Output readings are taken across a non-reactive load.
Output reference level is 50 mW total power.
The generator output shall terminate in an IRE loop and loop pointing toward rear of receiver.
Modulation: 400 Hz, 30%

	UNIT	NOMINAL	LIMIT
Frequency Range	MHz	11 – 22.8	12 – 22
IF	kHz	455	± 5
Sensitivity for 50 mW output, S/N 6 dB			
at 13 MHz	μV	7	20
at 16 MHz	μV	7	20
at 20 MHz	μV	7	20
Sensitivity for 20 dB S/N			
at 13 MHz	μV	20	40
at 16 MHz	μV	20	40
at 20 MHz	μV	20	40
Image rejection at 20 MHz	dB	10	4.5
Dial Calibration at 12 MHz	kHz		± 500
at 20 MHz	kHz		± 500

The oscillator must operate at 13 MHz, with all supply voltages above 4 V DC; an over-voltage of 10% shall not be harmful.

2. BLOCK DIAGRAM



3. DISASSEMBLY INSTRUCTIONS

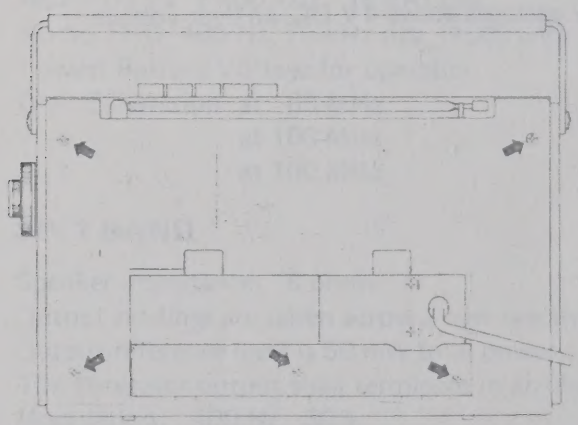


Figure A

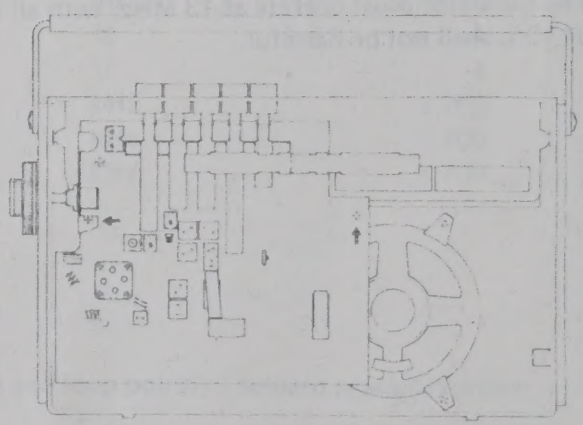
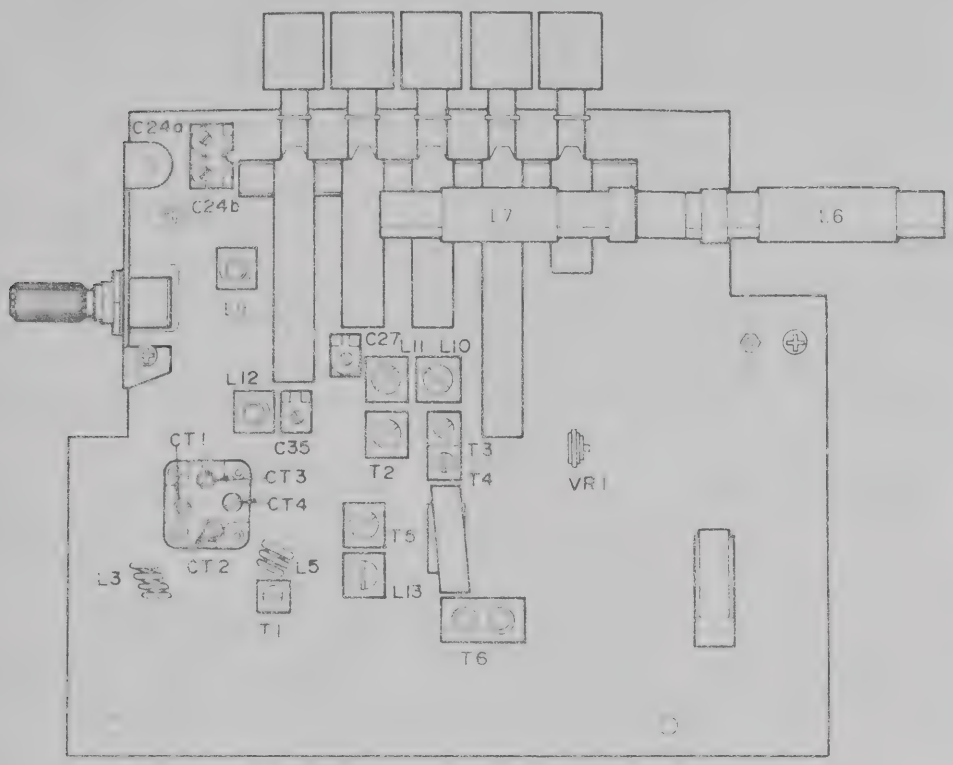


Figure B

NOTE:
- To remove rear cabinet, remove the 5 screws (indicated by arrow marks) from the rear (Figure A).
- Pull off TUNING, FINE TUNING, VOLUME and TONE knobs.
- Remove the antenna and Battery leads.
- Remove the 2 screws from the P.C.B. shown in Figure B.
- Carefully remove the P.C.B. from the cabinet.

4. ALIGNMENT INSTRUCTIONS

ALIGNMENT POINTS LOCATION



LIST OF TEST EQUIPMENT

1. DC Volt Meter (above 50 KΩ/V)
2. AM Signal Generator
3. Vacuum Tube Volt Meter
4. IF Sweep Generator
5. FM Signal Generator
6. Oscilloscope

GENERAL PREPARATION

- Check source voltage.
- Set function switch to band being aligned.
- FM and SW1, SW2 telescopic antennas should be disconnected.
- Signal input should be kept as low as possible to avoid AGC action.
- Standard modulation is 400 Hz 30% for AM and SW1, SW2.
- Standard modulation is 400 Hz 22.5 kHz deviation for FM.

IC 1 BIAS ALIGNMENT

Alignment	Equipment	Connection	Step	Gen. Freq.	Dial Setting	Adjustment	For
IC 1 BIAS	DC Volt Meter (above 50 kΩ/V)	See Figure 1.			Maximum Frequency	VR 1	Adjust for 0.5V between 4-6 terminal.

AM ALIGNMENT

Alignment	Equipment	Connection	Step	Gen. Freq.	Dial Setting	Adjustment	For
IF	AM Signal Generator VTVM	See Figure 2.		455 kHz	Maximum Frequency	T3, T4, L13	Maximum Output
TUNING RANGE	AM Signal Generator VTVM	See Figure 3.	1	510 kHz	Minimum Frequency	L10 OSC Coil	Maximum Output
			2	1650 kHz	Maximum Frequency	CT4	Maximum Output
			3	Repeat steps 1 and 2 until tuning range covers exactly from 510 kHz to 1650 kHz.			
TRACKING	AM Signal Generator VTVM	See Figure 3.	1	600 kHz	Tune to Signal.	L6 Antenna Coil	Maximum Output
			2	1400 kHz	Tune to Signal.	CT3	Maximum Output
			3	Repeat steps 1 and 2 until no further improvement can be made.			

FM ALIGNMENT

Alignment	Equipment	Connection	Step	Gen. Freq.	Dial Setting	Adjustment	For
IF	IF Sweep Generator, Oscilloscope	See Figure 4.		10.7 MHz	Maximum Frequency	T1, T2 T5, T6	Symmetrical S-Curve On Scope
TUNING RANGE	FM Signal Generator VTVM	See Figure 5.	1	88 MHz	88 MHz	L5 (Stretch or Squeeze)	Maximum Output
			2	108 MHz	108 MHz	CT2	Maximum Output
			3	Repeat steps 1 and 2 until tuning range covers exactly from 88 MHz to 108 MHz.			
TRACKING	FM Signal Generator VTVM	See Figure 5.	1	90 MHz	Tune to Signal.	L3 (Stretch or Squeeze)	Maximum Output
			2	106 MHz	Tune to Signal.	CT1	Maximum Output
			3	Repeat steps 1 to 3 until no further improvement can be made.			

SW 1 ALIGNMENT

Alignment	Equipment	Connection	Step	Gen. Freq.	Dial Setting	Adjustment	For
TUNING RANGE	AM Signal Generator VTVM	See Figure 6.	1	3.8 MHz	Minimum Frequency	L11 OSC Coil	Maximum Output
			2	12.5 MHz	Maximum Frequency	C27	Maximum Output
			3	Repeat steps 1 and 2 until tuning range covers exactly from 3.8 MHz to 12.5 MHz.			
TRACKING	AM Signal Generator VTVM	See Figure 6.	1	4.2 MHz	Tune to Signal.	L7 Antenna Coil	Maximum Output
			2	9 MHz	Tune to Signal.	C24A	Maximum Output
			3	Repeat steps 1 and 2 until no further improvement can be made.			

SW 2 ALIGNMENT

Alignment	Equipment	Connection	Step	Gen. Freq.	Dial Setting	Adjustment	For
TUNING RANGE	AM Signal Generator VTVM	See Figure 7.	1	11.3 MHz	Minimum Frequency	L12 OSC Coil	Maximum Output
			2	22.8 MHz	Maximum Frequency	C35	Maximum Output
			3	Repeat steps 1 and 2 until tuning range covers exactly from 11.3 MHz to 22.8 MHz.			
TRACKING	AM Signal Generator VTVM	See Figure 7.	1	13 MHz	Tune to Signal.	L9 Antenna Coil	Maximum Output
			2	20 MHz	Tune to Signal.	C24B	Maximum Output
			3	Repeat steps 1 and 2 until no further improvement can be made.			

5. EQUIPMENT CONNECTIONS

INTEGRATED CIRCUIT BIAS

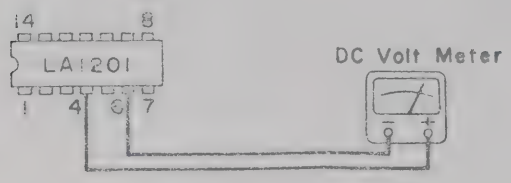


FIGURE 1

AM IF

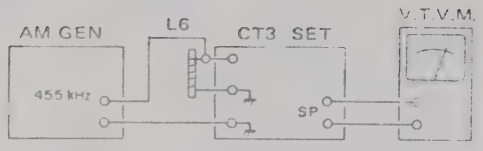


FIGURE 2

AM BAND/TRACKING

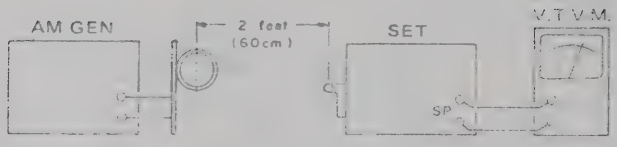


FIGURE 3

FM IF

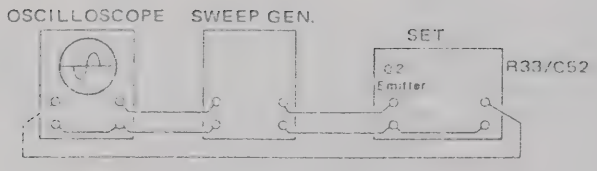


FIGURE 4

FM BAND/TRACKING

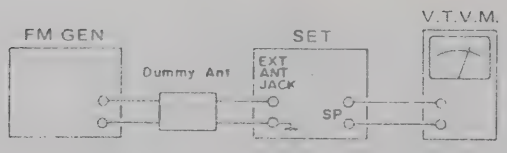


FIGURE 5

SW 1 BAND TRACKING

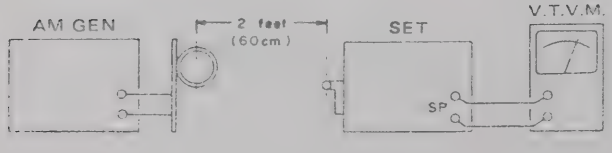


FIGURE 6

SW 2 BAND TRACKING

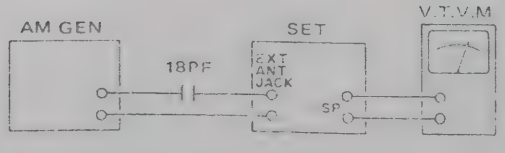


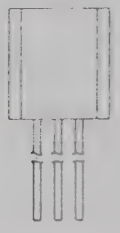
FIGURE 7

6. TROUBLE SHOOTING CHART

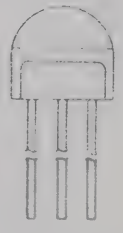
SYMPTOM	CAUSE/REMEDY
1) No output	A) Faulty AC power cord: * Replace the cord. B) Broken wire in the Battery Case: * Repair or replace. C) Open power transformer: * Replace the transformer. D) Defect in the power switch: * Replace the switch. E) Battery polarity is wrong: * Correct battery. F) Weak battery: * Replace. G) D7/9 Rectifier defective: * Replace. H) Defective Q5 or D11 circuity: * Replace defective component(s). I) HEADPHONE JACK is defective: * Repair or replace. J) Speaker voice coil is broken: * Replace. K) Defective IC: * Replace defective IC. L) Defect in VOLUME Control: * Replace it. M) Defective IC: * Replace defective IC.
2) No AM	A) Poor contact selector switch: * Repair or replace switch. B) Transistor, diode, IFT, IC, resistor, coil or capacitor in AM IF circuit defective: * Replace the defective component(s). C) Bar Antenna coil defective: * Repair or replace.
3) No FM	A) Poor contact selector switch: * Repair or replace switch. B) Transistor, diode, IFT, IC, coil, resistor or capacitor in FM IF circuit defective: * Replace the defective component(s). C) Poor contact in ANT lead: * Repair as required.
4) No SW1	A) Poor contact selector switch: * Repair or replace switch. B) Transistor, diode, IFT, IC, resistor, coil or capacitor in AM IF circuit defective: * Replace the defective component(s). C) Bar Antenna coil defective: * Repair or replace.
5) No SW2	A) Poor contact selector switch: * Repair or replace switch. B) Transistor, diode, IFT, IC, coil, resistor or capacitor in AM IF circuit defective: * Replace the defective component(s). C) Poor contact in ANT lead: * Repair as required.

SYMPTOM	CAUSE/REMEDY
6) No effect at full length of rod Antenna on FM, SW1, SW2	A) Poor contact of band selector switch and rod Antenna: * Repair or replace. B) Broken wire between band selector switch and rod antenna: * Repair or replace.
7) No effect when connecting EXT. ANT.	A) Poor contact on jack for EXT. ANT. or defective jack: * Repair or replace.
8) HEADPHONE jack does not function.	A) Poor contact on HEADPHONE jack or defective: * Repair or replace.
9) TONE does not work.	A) VR3 control defective: * Replace. B) Defective C62: * Replace.
10) Distortion	A) Power voltage is lower than required: * Replace battery.

7. IC & TRANSISTOR LEAD IDENTIFICATIONS



ECB

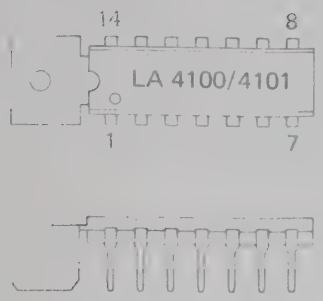


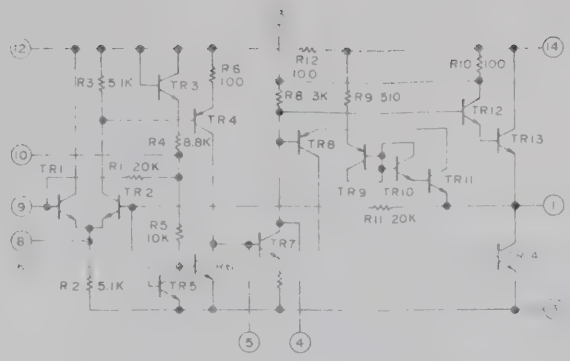
E C B

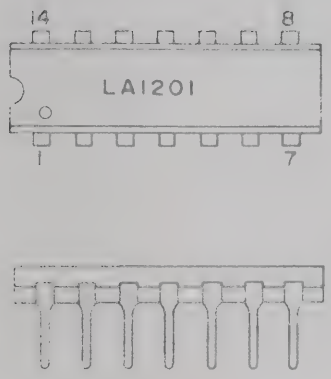
2SC 1317

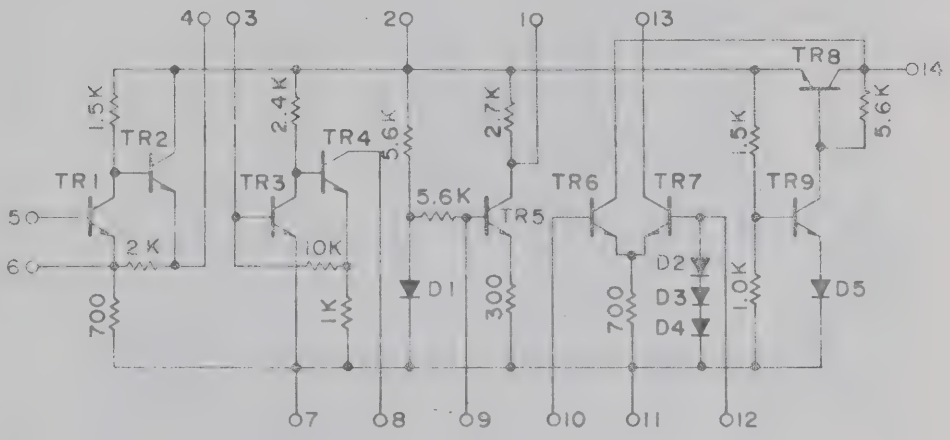
2SC 668, 2SC 930

IC INTERNAL CONNECTION

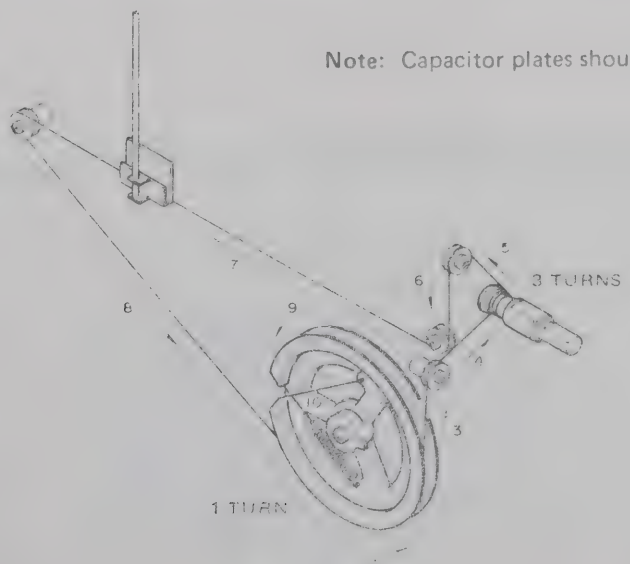








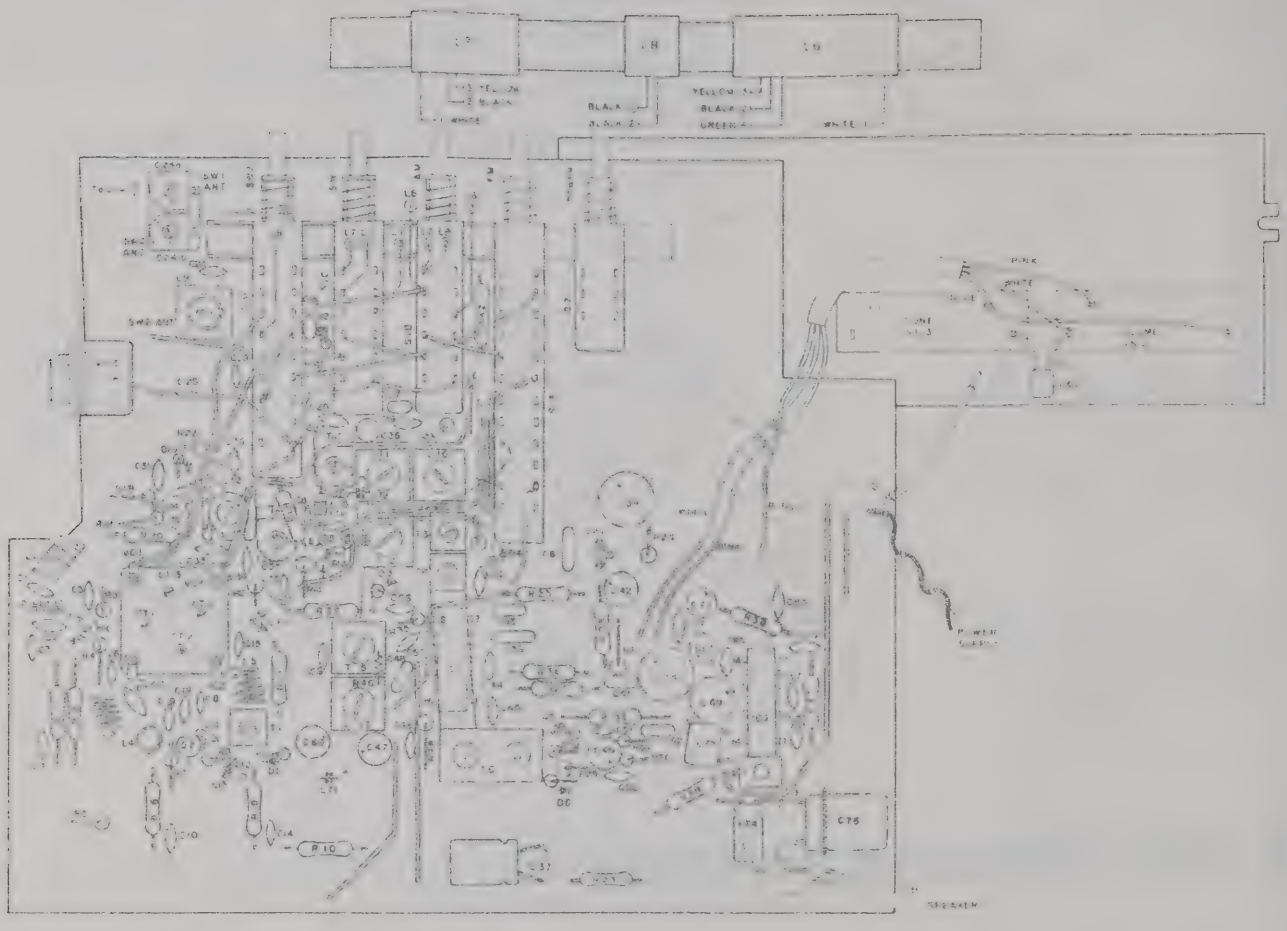
8. DIAL STRINGING DIAGRAM



Note: Capacitor plates should be closed.

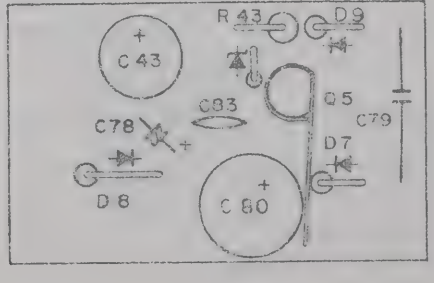
9. PRINTED CIRCUIT BOARD

TOP VIEW

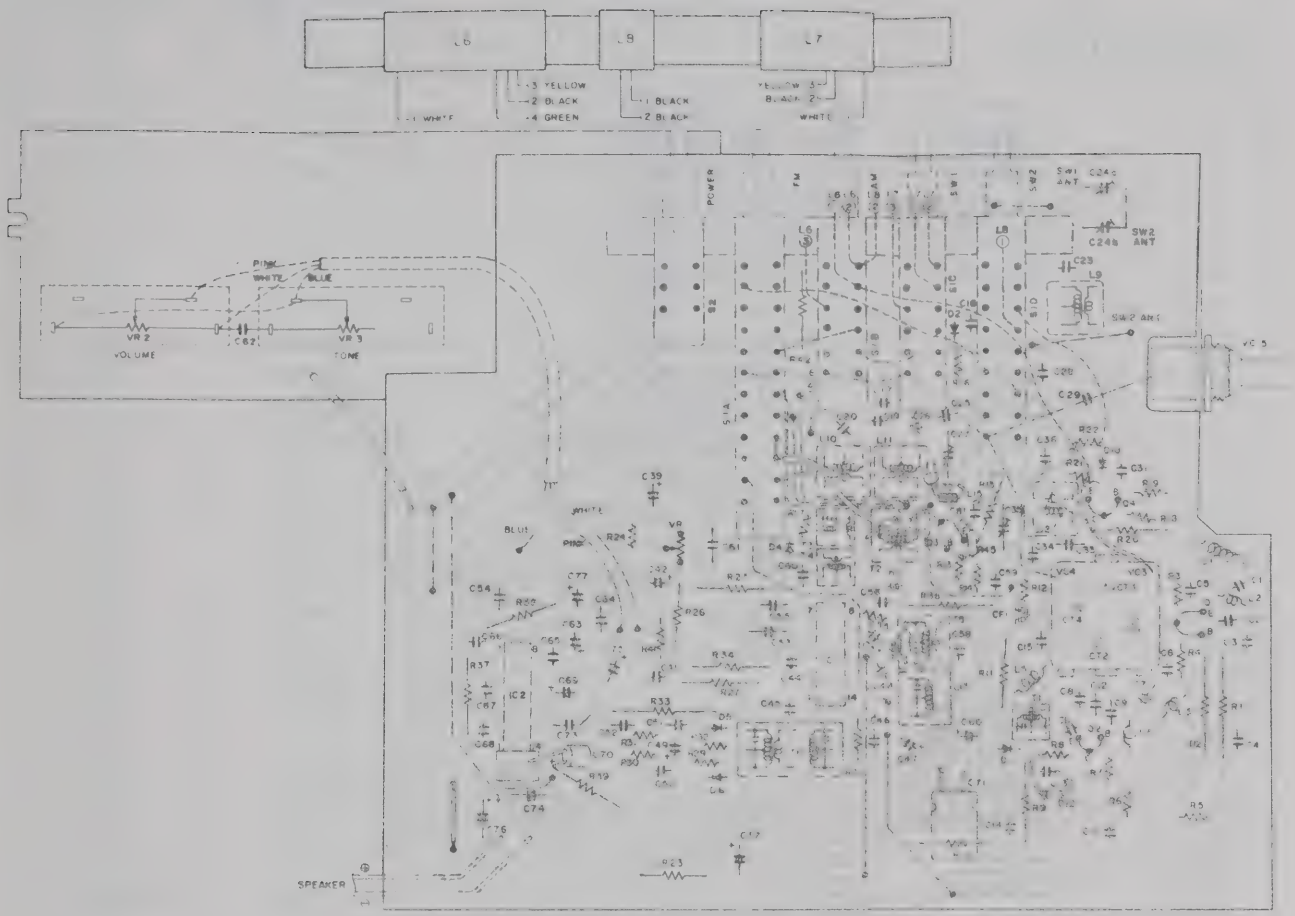


10. POWER SUPPLY PRINTED CIRCUIT BOARD

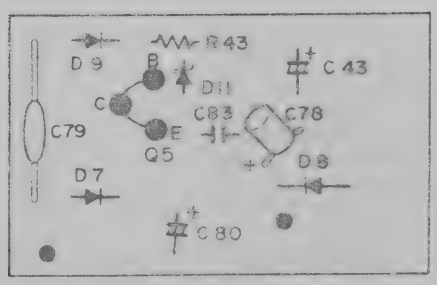
TOP VIEW



BOTTOM VIEW



BOTTOM VIEW



11. ELECTRICAL PARTS LIST

REF. NO.	DESCRIPTION	RS PART NO.	MFR'S PART NO.
CAPACITORS			
C1	Ceramic 7 pF ± 0.5 pF 50 WV		
C2	Ceramic 20 pF ± 10% 50 WV		
C3	Ceramic 30 pF ± 10% 50 WV		
C4	Ceramic 0.02μF 25 WV		
C5	Ceramic 0.02μF 25 WV		
C6	Ceramic 20 pF ± 10% 50 WV		
C7	Ceramic 4 pF ± 0.5 pF 50 WV		
C8	Ceramic 40 pF ± 10% 50 WV		
C9	Ceramic 470 pF ± 10% 50 WV		
C10	Ceramic 0.02μF 25 WV		
C11	Ceramic 5 pF ± 0.5 pF 50 WV (NPO)		
C12	Ceramic 0.01μF 25 WV		
C13	Ceramic 3 pF ± 0.5 pF 50 WV (NPO)		
C14	Ceramic 0.01μF 25 WV		
C15	Ceramic 12 pF±0.5 pF 50 WV (NPO)		
C16	Ceramic 0.02μF 25 WV		
C17	Mylar 0.01μF ± 20% 50 WV		
C18	Not used		
C19	Ceramic 3 pF ± 0.5 pF 50 WV (NPO)		
C20	Polystyrene 240 pF ± 5% 35 WV		
C21	Not used		
C22	Not used		
C23	Ceramic 20 pF ± 10% 50 WV		
C24A·B	Trimmer 15 pF	CA-0195	P-160005
C25	Ceramic 0.002μF 50 WV		
C26	Polystyrene 2000pF ± 5% 35 WV		
C27	Trimmer 15 pF	CA-0194	P-160004
C28	Ceramic 55 pF ± 10% 50 WV		
C29	Ceramic 12 pF ± 0.5 pF 50 WV (NPO)		
C30	Not used		
C31	Ceramic 0.02μF 25 WV		
C32	Not used		
C33	Ceramic 680 pF ± 10% 50 WV		
C34	Ceramic 65 pF ± 10% 50 WV (NPO)		
C35	Trimmer 15 pF	CA-0194	P-160004
C36	Ceramic 0.02μF 25 WV		
C37	Electrolytic 100μF/6.3 V		
C38	Not used		
C39	Electrolytic 100μF/6.3 V		
C40	Ceramic 0.04μF 25 WV		
C41	Mylar 0.01μF ± 20% 50 WV		
C42	Electrolytic 10μF/16 V		
C43	Electrolytic 100μF/10 V		
C44	Ceramic 0.02μF 25 WV		
C45	Mylar 0.01μF ± 20% 50 WV		
C46	Ceramic 0.04μF 25 WV		

REF. NO.	DESCRIPTION	RS PART NO.	MFR'S PART NO.
C47	Electrolytic 10μF/16 V		
C48	Mylar 0.047μF ± 20% 50 WV		
C49	Electrolytic 3.3μF/16 V		
C50	Ceramic 0.01μF 25 WV		
C51	Ceramic 0.01μF 25 WV		
C52	Mylar 0.022μF ± 20% 50 WV		
C53	Mylar 0.1μF ± 20% 50 WV		
C54	Ceramic 220 pF ± 10% 50 WV		
C55	Mylar 0.047μF ± 20% 50 WV		
C56	Ceramic 2 pF ± 0.5pF 50 WV		
C57	Ceramic 0.02μF 25 WV		
C58	Ceramic 0.02μF 25 WV		
C59	Ceramic 0.02μF 25 WV		
C60	Electrolytic 4.7μF/16 V		
C61	Mylar 0.1μF ± 20% 50 WV		
C62	Mylar 0.047μF ± 20% 50 WV		
C63	Electrolytic 3.3μF/16 V		
C64	Mylar 0.0047μF ± 20% 50 WV		
C65	Ceramic 0.001μF 50 WV		
C66	Ceramic 0.001μF 50 WV		
C67	Ceramic 70 pF ± 10% 50 WV		
C68	Ceramic 0.001μF 50 WV		
C69	Electrolytic 100μF/6.3 V		
C70	Electrolytic 220μF/10 V		
C71	Electrolytic 470μF/10 V		
C72	Ceramic 50 pF ± 10% 50 WV		
C73	Mylar 0.22μF ± 20% 50 WV		
C74	Electrolytic 47μF/10 V		
C75	Electrolytic 220μF/6.3 V		
C76	Electrolytic 220μF/6.3 V		
C77	Electrolytic 33μF/10 V		
C78	Electrolytic 220μF/10 V		
C79	Ceramic 0.02μF 25 WV		
C80	Electrolytic 220μF/10 V		
C81	Ceramic 30 pF ± 10% 50 WV		
C82	Not used		
C83	Mylar 0.047μF ± 20% 50 WV		

REF. NO.	DESCRIPTION	RS PART NO.	MFR'S PART NO.
RESISTORS			
R1	Carbon PZ 330 ohm ¼ W		
R2	Carbon PZ 1K ohm ¼ W		
R3	Carbon UZ 180K ohm ¼ W		
R4	Carbon UZ 150 ohm ¼ W		
R5	Carbon UZ 47 ohm ¼ W		
R6	Carbon PZ 2.2K ohm ¼ W		
R7	Carbon UZ 150K ohm ¼ W		
R8	Carbon UZ 100 ohm ¼ W		
R9	Carbon PZ 100K ohm ¼ W		
R10	Carbon PZ 470K ohm ¼ W		
R11	Carbon PZ 270 ohm ¼ W		
R12	Carbon UZ 330 ohm ¼ W		
R13	Carbon UZ 270K ohm ¼ W		
R14	Carbon UZ 2.2K ohm ¼ W		
R15	Carbon PZ 0–47 ohm ¼ W		
R16	Carbon PZ 2.2K ohm ¼ W		
R17	Carbon UZ 0~1K ohm ¼ W		
R18	Carbon UZ 68K ohm ¼ W		
R19	Carbon UZ 47K ohm ¼ W		
R20	Carbon PZ 1.8K ohm ¼ W		
R21	Carbon UZ 680 ohm ¼ W		
R22	Carbon UZ 2.2K ohm ¼ W		
R23	Carbon PZ 22 ohm ¼ W		
R24	Carbon PZ 22 ohm ¼ W		
R25	Carbon PZ 4.7K ohm ¼ W		
R26	Carbon PZ 10K ohm ¼ W		
R27	Carbon PZ 680 ohm ¼ W		
R28	Carbon UZ 560 ohm ¼ W		
R29	Carbon UZ 1K ohm ¼ W		
R30	Carbon UZ 10K ohm ¼ W		
R31	Carbon UZ 10K ohm ¼ W		
R32	Carbon UZ 1K ohm ¼ W		
R33	Carbon PZ 33 ohm ¼ W		
R34	Carbon PZ 2.2K ohm ¼ W		
R35	Carbon UZ 330 ohm ¼ W		
R36	Carbon PZ 22K ohm ¼ W		
R37	Carbon PZ 2.2K ohm ¼ W		
R38	Carbon PZ 68~150 ohm ¼ W		
R39	Carbon PZ 47 ohm ¼ W		
R40	Carbon PZ 2.2M ohm ½ W		
R41	Carbon UZ 10K ohm ¼ W		
R42	Carbon PZ 1.2M ohm ½ W		
R43	Carbon PZ 560 ohm ½ W		
R44	Not used		
R45	Carbon PZ 22 ohm ¼ W		
R46	Carbon PZ 10K~∞ ohm ¼ W		

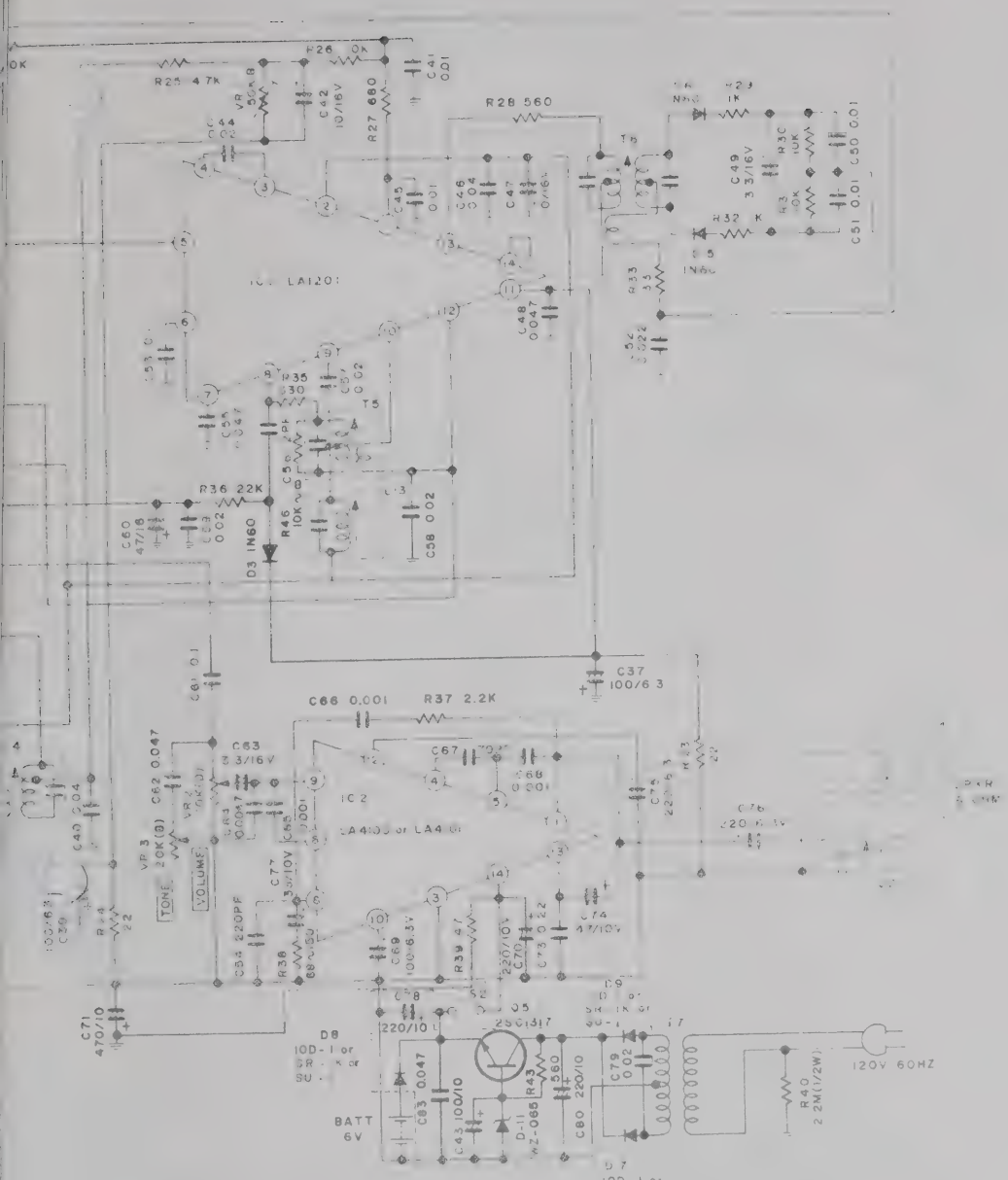
REF. NO.	DESCRIPTION	RS PART NO.	MFR'S PART NO.
CERAMIC FILTER			
CF1	Ceramic Filter CFS 10.7M		P-140017
DIODES			
D1	Varicap Diode 1S2687		
D2	Silicon Diode WG-713		
D3	Diode 1N60		
D4	Diode 1N60		
D5	Diode 1N60P		
D6	Diode 1N60P		
D7	Silicon Rectifier SR-1K or 10D-1 or SU-1		
D8	Silicon Rectifier SR-1K or 10D-1 or SU-1		
D9	Silicon Rectifier SR-1K or 10D-1 or SU-1		
D10	Silicon Diode WG-713		
D11	Zener Diode WZ-065		
D12	Silicon Diode WG-713		
INTEGRATED CIRCUIT			
IC1	LA1201		
IC2	LA4100 or LA4101		
COILS			
L1	FM Filter Coil HR5-14½TI	CA-3369	P-340030
L2	FM ANT Coil HL5-3½TI	CA-3600	P-340020
L3	FM RF Coil HR4-4½TI	CA-4727	P-340047
L4	FM Trap Coil VL4-14½TI	CA-3574	P-340018
L5	FM OSC Coil HL6-2½TII	CA-4729	P-340051
L6	AM ANT Coil 10ϕ X 120	CA-3614	P-110060
L7	AM ANT Coil 10ϕ X 120	CA-3614	P-110060
L8	AM ANT Coil 10ϕ X 120	CA-3614	P-110060
L9	ANT Coil (AC-018)	CA-2902	P-110018
L10	AM OSC Coil OC-016	CA-4331	P-120016
L11	SW OSC Coil OC-059	CA-4739	P-120059
L12	OSC Coil (OC-018)	CA-4438	P-120018
L13	AM IF Coil 10A-043	CA-3601	P-130043
L14	Ferrite Inductor 0.68μH	CA-2903	P-360010
L15	Ferrite Inductor 0.92μH		P-360028
TRANSISTORS			
Q1	Transistor 2SC 668 (C)		
Q2	Transistor 2SC 930 (C) or 2SC 668 (C)		
Q3	Transistor 2SC 668 (C)		
Q4	Transistor 2SC 930 (D)		
Q5	Transistor 2SC1317 (Q, R)		

REF. NO.	DESCRIPTION	RS PART NO.	MFR'S PART NO.
SPEAKER			
SPKR	Speaker 8 ohms		P-270046
SWITCHES			
S1A-D	Band Selector Switch	S-7274	P-180205
S2	Power Switch	S-7274	P-180205
TRANSFORMERS			
T1	FM IFT (7F-013)	CA-7253	P-140013
T2	FM IFT (10F-011)	CA-7254	P-140011
T3	AM IFT (7A-041)	CA-7604	P-130041
T4	AM IFT (7A-042)	CA-7605	P-130042
T5	FM IFT (10F-011)	CA-7254	P-140011
T6	FM IFT (10F-019)	CA-7517	P-140019
T7	Power Transformer UL/CSA	TA-0569	P-100393
T7	Power Transformer (For Australia)		P-100405
T7	Power Transformer (For Europe)		P-100401
VARIABLE RESISTORS			
VR1	Semi-Fixed 50KB	P-6534	P-170177
VR2	VOLUME 10KD	P-1678	P-170224
VR3	TONE 20KB		P-170225
VARIABLE CAPACITORS			
VC1–VC4	Poly-Variable Capacitor 266PX2, 20PX2	C-4574	P-150021
VC5	Fine Tuning	D-3201	P-150022
PRINTED CIRCUIT BOARD			
P.C.B.	Printed Circuit Board		P-200310
P.C.B.	Power Supply Board		P-200311

12. EXPLODED VIEW PARTS LIST

REF. NO.	DESCRIPTION	RS PART NO.	MFR'S PART NO.
1	Handle	H-6198	P-610392
2	Handle Bracket	HB-4792	P-710073
3	Handle Shaft	HB-4793	P-420220
4	Side Panel (L)	Z-2835	P-710075
5	Bracket L-Type	Z-2834	P-410874
6	Control Knob	K-2241	P-650181
7	Earphone Jack	J-0676	P-190067
8	Jack Holder		P-610427
9	Decoration Frame	Z-2844	P-710074
10	Cabinet	Z-2833	P-600094
11	Badge		P-720008
12	Dial Window	D-5214	P-610391
13	Speaker Net	HB-4787	P-660097
14	Speaker Bracket	HB-4786	P-410278
15	Speaker		P-270046
16	Volume Cover A		P-660129
17	Cushion		P-680127
18	Volume Pointer	K-2231	P-610394
19	Dial Scale		P-640118
20	Dial Rear Panel	D-5213	P-410879
21	VOLUME	P-1678	P-170224
22	TONE Control		P-170225
23	Pulley C	D-0269	P-430007
24	Shaft A for Pulley	D-3202	P-420233
25	Pointer	D-1187	P-450047
26	POWER Indicator	HB-4778	P-710077D
27	FM Indicator	HB-4775	P-710077A
28	AM Indicator	HB-4776	P-710077B
29	Short Wave Indicator	HB-4777	P-710077C
30	Selector Knob	K-2230	P-650180
31	AM/SW ANT Coil (L6, 7, 8)	CA 3614	P-110060
32	Antenna Holder		P-610395
33	Shaft B for Pulley	D-3203	P-420234
34	TUNING Holder	HB 4774	P-410878
35	Spacer		P-420236
36	FINE TUNING	D-3201	P-150022
37	Printed Circuit Board		P-200310
38	Large Pulley 76	D-0359	P-430031
39	Battery Cover	DB-0158	P-600094
40	Battery Cushion		P-820322
41	Rod Antenna	A-0295	P-330018
42	AC Line Cord	W-1584	P-310024

REF. NO.	DESCRIPTION	RS PART NO.	MFR'S PART NO.
43	Cord Stopper		P-480010
44	Rear Cabinet	DB-0158	P-600094
45	Battery Contact	HB-2408	P-410617
46	EXT ANT Jack	J-0751	P-190068
47	POWER Supply P.C.B.		P-200311
48	POWER Transformer	TA-0569	P-100393
49	Stopper Bracket		P-410877
50	Battery Spring		P-440068
51	Lug Terminal		P-320088
52	FINE TUNING Knob	K-2239	P-650182
53	TUNING Knob	K-2238	P-650179
54	Side Panel (R)	Z-2843	P-710076
55	Handle Stopper	HB-4784	P-410875
56	Spring (FINE TUNING Knob Ass'y)		P-440102
57	Spring (TUNING Knob Ass'y)		P-440090
58	Spring		P-440094
59	Dial String Spring		P-440075
60	Antenna Washer		P-410985
61	Dial String		



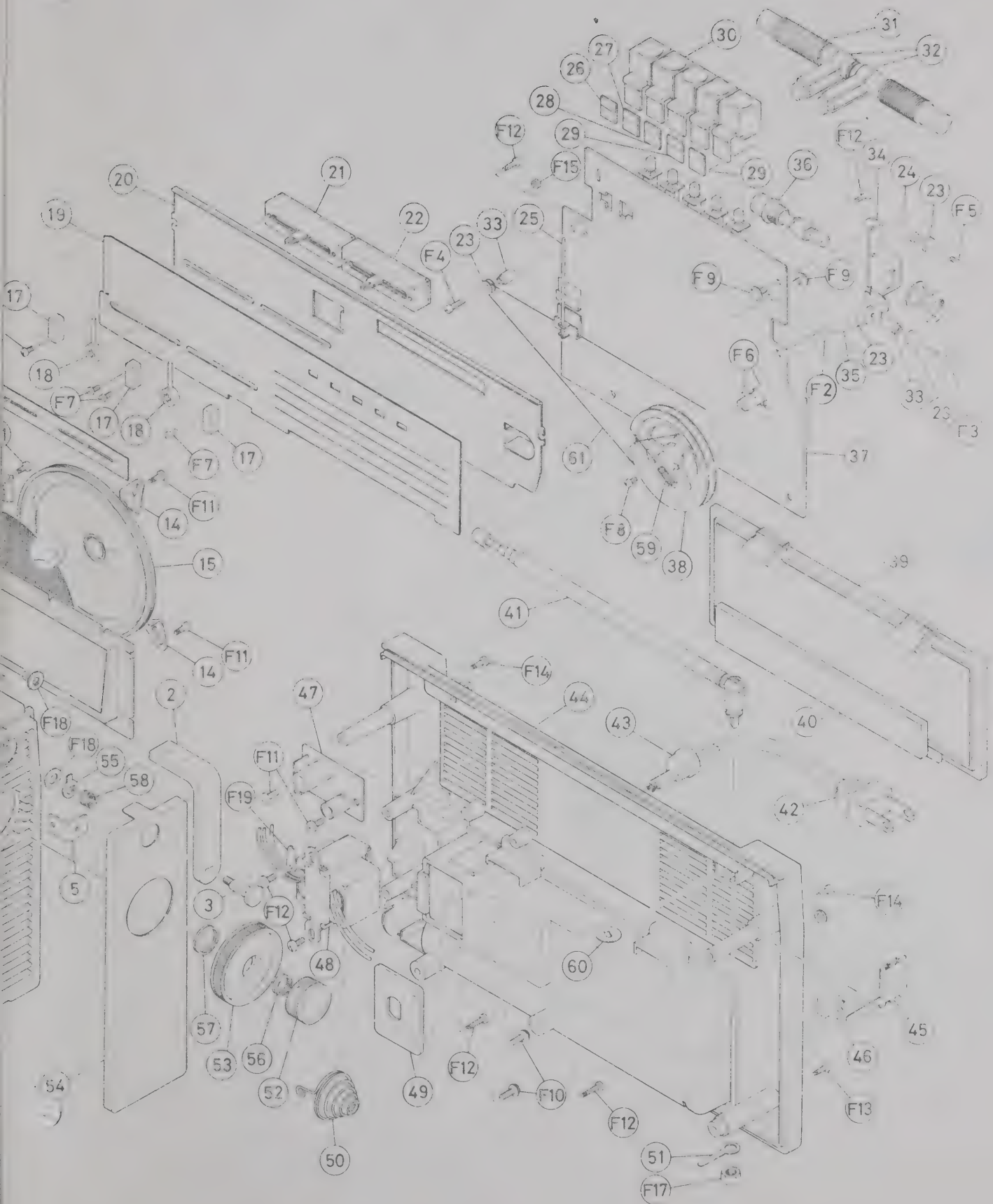
IC & TRANSISTOR VOLTAGE CHART

TRANSISTOR VOLTAGE CHART

		FM	AM	SW	SW2
Q1	E	0.3	5.3	5.3	5.3
	C	5.6	5.8	5.8	5.8
	B	1.2	1.3	1.2	1.3
Q2	E	1.8	5.3	5.3	5.3
	C	5.6	5.8	5.8	5.8
	B	2.4	5.6	5.6	5.6
Q3	E	6	2.2	2.2	1.7
	C	5.6	5.7	5.7	5.7
	B	6.5	7.4	7.4	7.0
Q4	E	3.6	1.2	1.2	1.2
	C	5.5	5.4	5.4	5.4
	B	3.6	1.9	1.9	1.9

IC 2 VOLTAGE CHART

P.N NO		2				5	6	7	8	9			12		14
FM	IC1	3.3	3.6	2											
	IC2	3.4	–			0	3.4	–			1.4			6	
AM	IC1	2.9	3.6	1.1	1.7		0	0.2	3.3				5.7	5.8	5.7
	IC2	3.4	–			0	3.4	–	2.5		3.4			6	
SW1	IC1	3.1	3.6		1.8	1.8	0	0.2	3.3		0.2	0.3	0.2	5.8	5.7
	IC2	3.4	–	0	0	0	3.4	–	0.5		3.4	–	6.0	6.5	6.2
SW2	IC1	3.1	3.6	1.1	1.5	1.8	0	0.2	3.3		0.2	0.3	0.2	5.8	5.7
	IC2	3.4	–	0	0	0	3.4	–	0.5	1.1	3.4	–	6.0	6.5	6.2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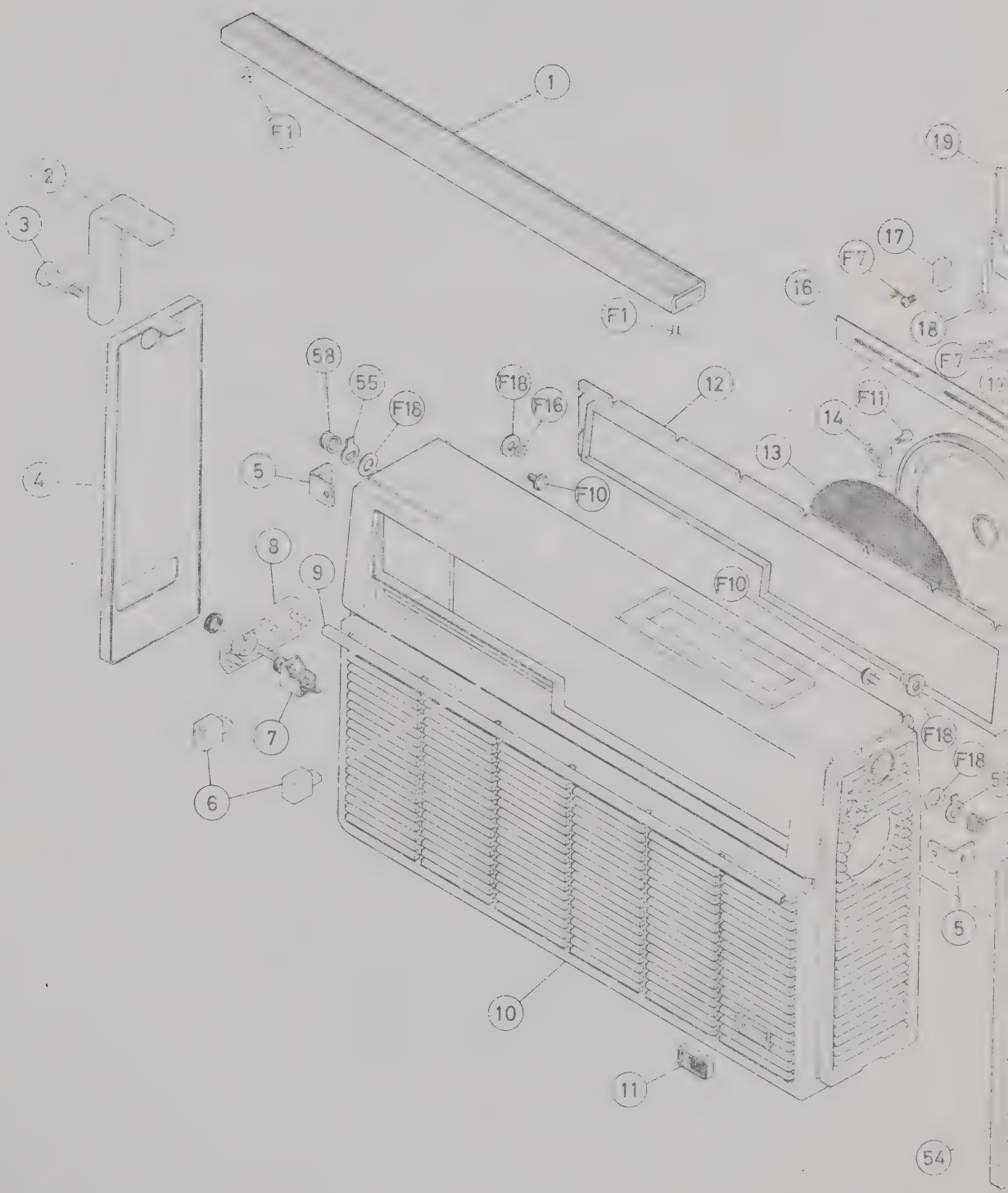
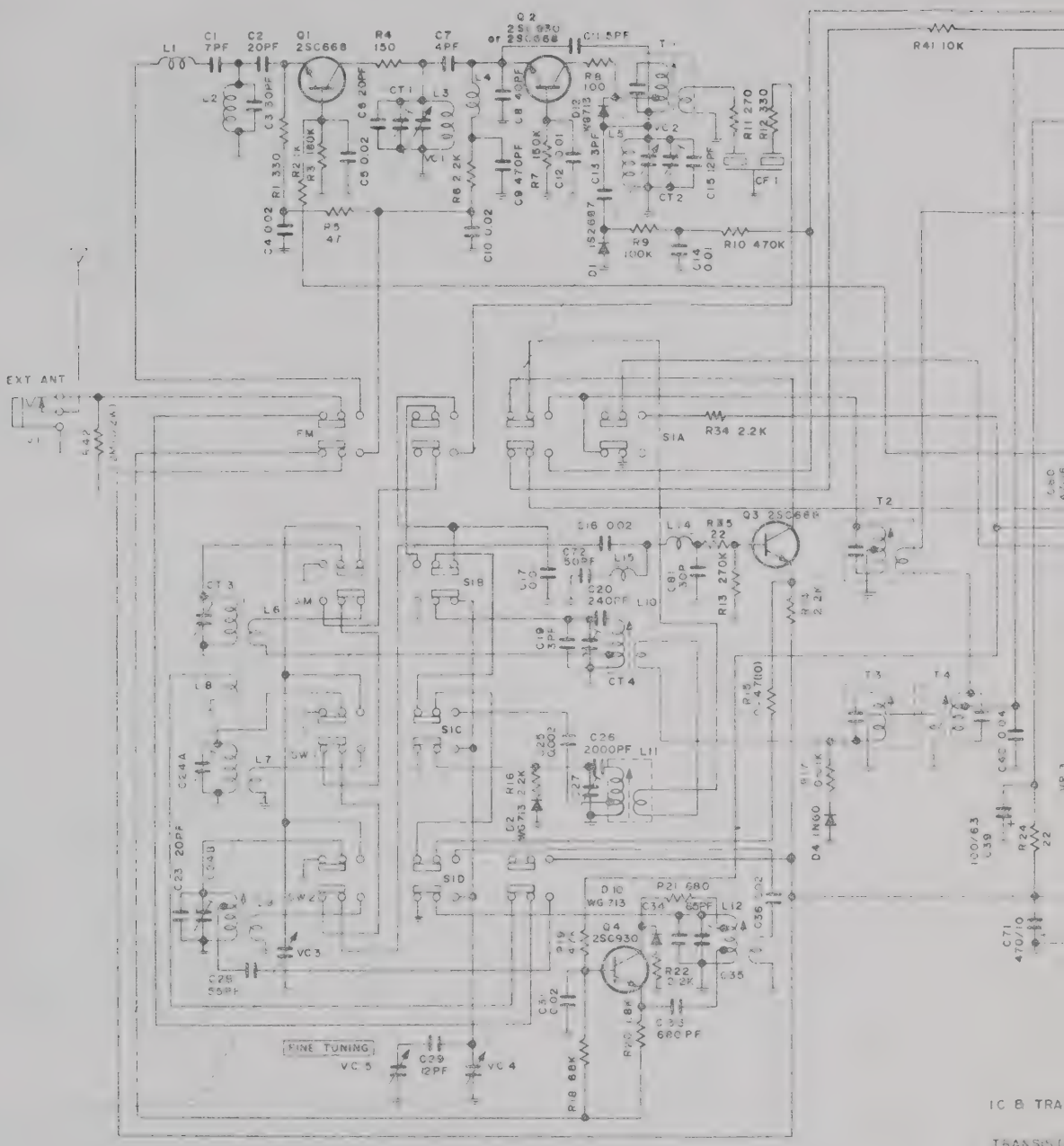
14. EXPLODED VIEW

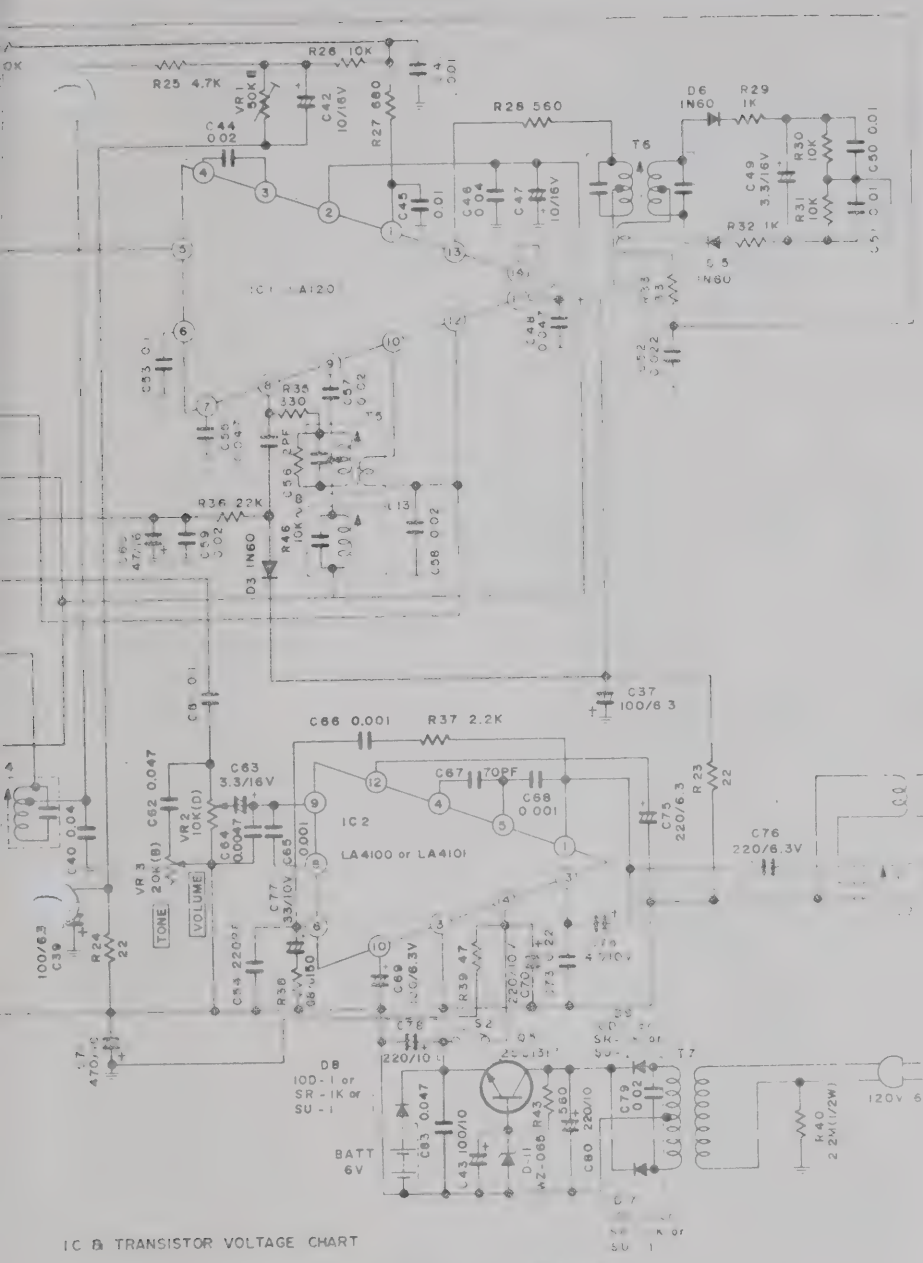


13. SCHEMATIC DIAGRAM



NOTES

1. SWITCHES: S1A - S1D BAND SELECTOR SWITCH, S2 POWER SWITCH
2. ALL RESISTOR VALUES ARE INDICATED IN OHM (K = 10^3 OHM, M = 10^6 OHM).
3. ALL CAPACITOR VALUES ARE INDICATED IN μF (P = $10^6 \mu$F).
4. ALL VOLTAGE VALUES ARE INDICATED IN VOLTS WITH NO SIGNAL, MEASURED WITH V.T.V.M



IC & TRANSISTOR VOLTAGE CHART

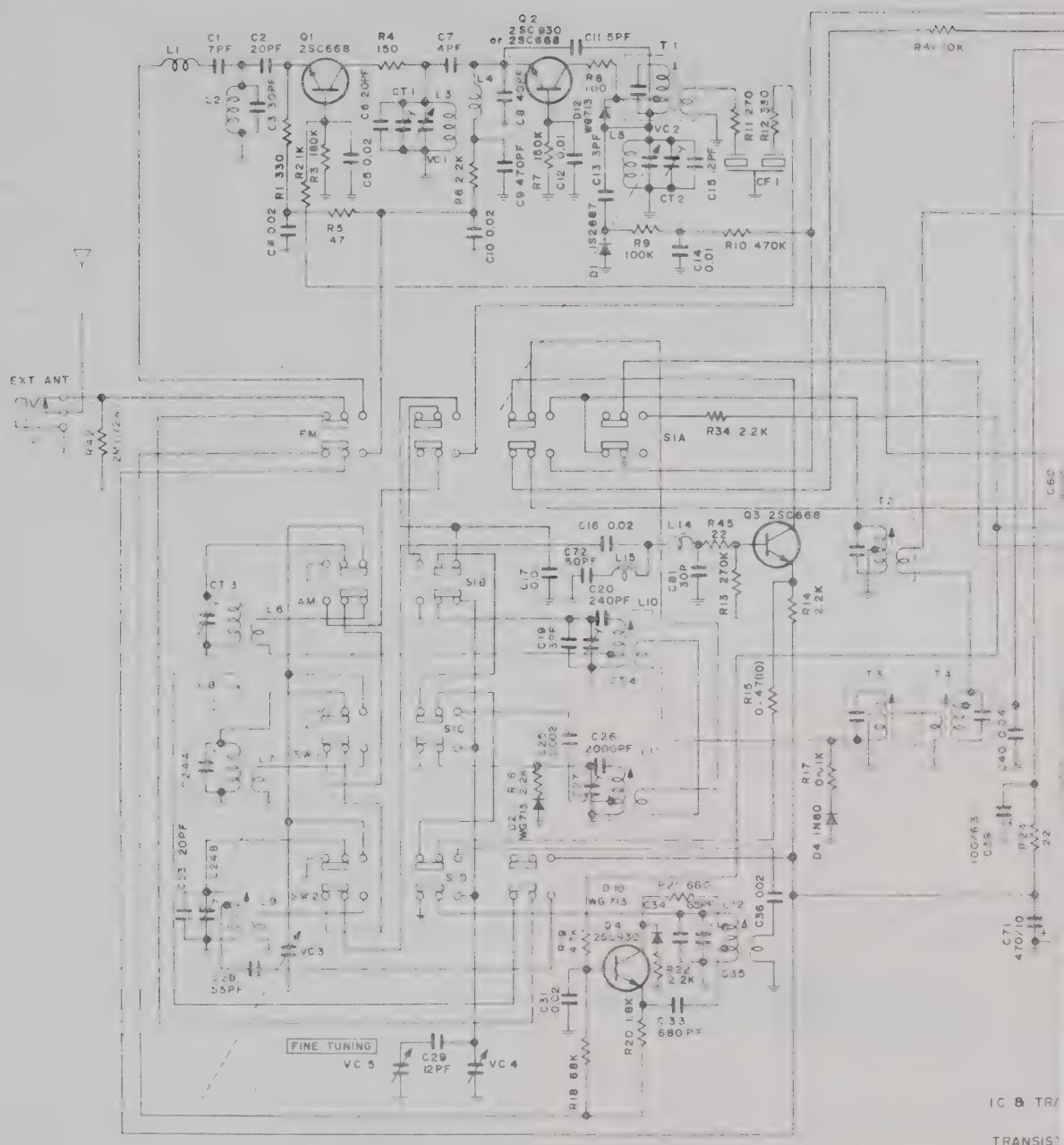
TRANSISTOR VOLTAGE CHART

		FM	AM	SW	SW2
IC1	E	0.3	5.3	5.3	5.3
	C	5.6	5.8	5.8	5.8
	B	1.2	1.3	1.2	1.3
Q2	E	1.8	5.3	5.3	5.3
	C	5.6	5.8	5.8	5.8
	B	2.4	5.6	5.6	5.6
Q3	E	1.6	2.2	2.2	2
	C	5.6	5.7	5.7	5.7
	B	6.5	7.4	7.4	7.0
Q4	E	2.6	1.2	2	2
	C	5.6	5.4	5.4	5.4
	B	3.6	1.9	1.9	1.9

IC 2 VOLTAGE CHART

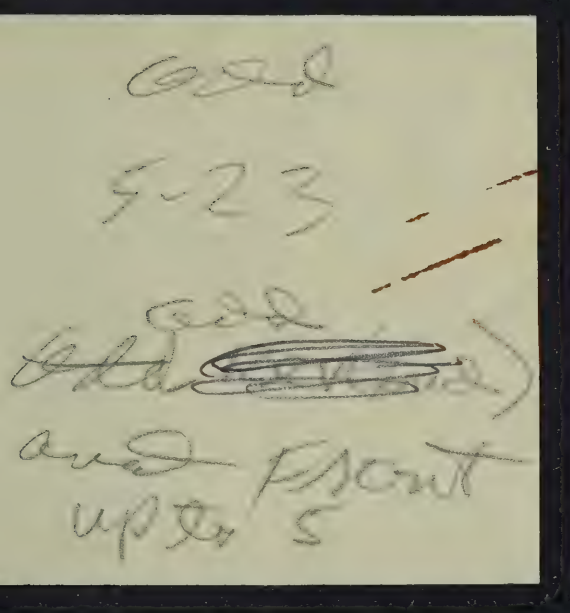
PIN NO.		1	2	3	4	5	6	7	8	9	10	11	12	13	14
FM	IC1	3.6	-	-	9	1.8	-	-	0.3	5.3	-	-	5.3	5.3	5.3
	IC2	3.4	-	-	-	-	3.4	-	5	-	7.4	6	5	5.6	-
AM	IC1	2.9	3.6	1	1.7	7	5	0.2	5.3	-	-	5.2	5.8	5.7	-
	IC2	3.4	-	-	-	-	3.4	-	-	-	7.4	-	-	-	-
SW	IC1	3.1	3.6	1.1	6	1.8	0	0.2	5.3	-	-	5.2	5.8	5.7	-
	IC2	3.4	-	-	-	0	3.4	-	0.5	-	3.4	-	6.0	6.1	6.2
SW2	IC1	3.1	3.6	1.1	6	1.8	0	0.2	5.3	-	-	5.2	5.8	5.7	-
	IC2	3.4	-	-	-	0	3.4	-	0.5	-	3.4	-	6.0	6.5	6.4

13. SCHEMATIC DIAGRAM



NOTES

1. SWITCHES: S1A - S1D BAND SELECTOR SWITCH, S2 POWER SWITCH
2. ALL RESISTOR VALUES ARE INDICATED IN OHM (K = 10^3 OHM, M = 10^6 OHM).
3. ALL CAPACITOR VALUES ARE INDICATED IN μF (P = $10^6 \mu$F).
4. ALL VOLTAGE VALUES ARE INDICATED IN VOLTS WITH NO SIGNAL, MEASURED WITH V.T.V.M



REF. NO.	DESCRIPTION	RS PART NO.	MFR'S PART NO.
F1	Screw 3 X 6F		
F2	Screw 2 X 6P		
F3	Screw 2 X 10P		
F4	Screw 2 X 12P		
F5	Screw 2 X 16P		
F6	Screw 2.6 X 3P		
F7	Screw 2.6 X 3P (BLACK COLOR)		
F8	Screw 2.6 X 6P		
F9	Screw 3 X 5P		
F10	Triple Screw 3 X 6P		
F11	Tapping Screw 3 X 8PTII		
F12	Tapping Screw 3 X 10PTII		
F13	Tapping Screw 3 X 20PTII		
F14	Screw 3 X 38P		
F15	Nut 2N		
F16	Nut 3N		
F17	Nut 5N		
F18	Nylon Washer 0.5t X 5.2ϕ X 8ϕ		
F19	Egg Lug 3ϕ		

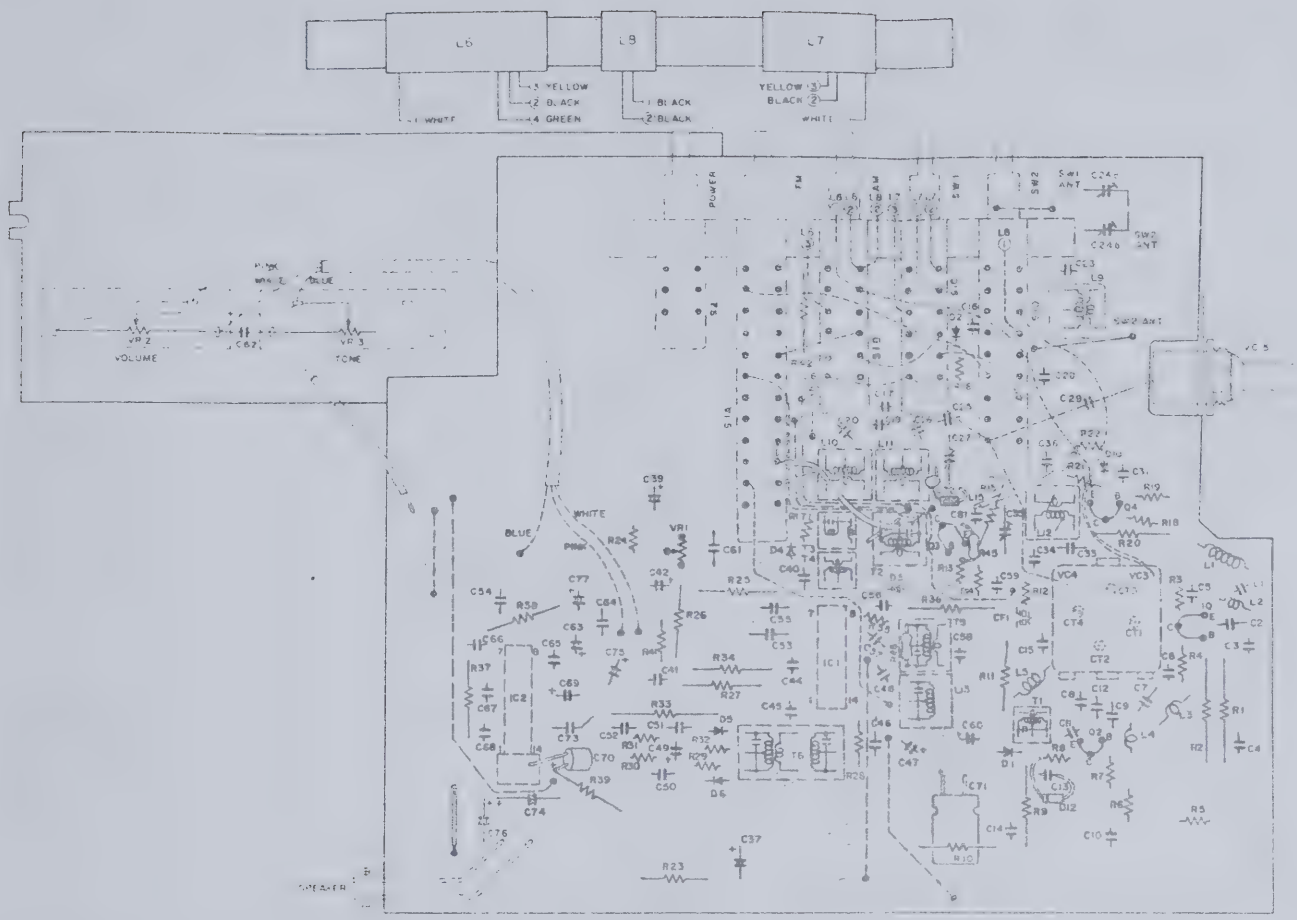
12. EXPLODED VIEW PARTS LIST

REF. NO.	DESCRIPTION	RS PART NO.	MFR'S PART NO.
1	Handle	H-6198	P-610392
2	Handle Bracket	HB-4792	P-710073
3	Handle Shaft	HB-4793	P-420220
4	Side Panel (L)	Z-2835	P-710075
5	Bracket L-Type	Z-2834	P-410874
6	Control Knob	K-2241	P-650181
7	Earphone Jack	J-0676	P-190067
8	Jack Holder		P-610427
9	Decoration Frame	Z-2844	P-710074
10	Cabinet	Z-2833	P-600094
11	Badge		P-720008
12	Dial Window	D-5214	P-610391
13	Speaker Net	HB-4787	P-660097
14	Speaker Bracket	HB-4786	P-410278
15	Speaker		P-270046
16	Volume Cover A		P-660129
17	Cushion		P-680127
18	Volume Pointer	K-2231	P-610394
19	Dial Scale		P-640118
20	Dial Rear Panel	D-5213	P-410879
21	VOLUME	P-1678	P-170224
22	TONE Control		P-170225
23	Pulley C	D-0269	P-430007
24	Shaft A for Pulley	D-3202	P-420233
25	Pointer	D-1187	P-450047
26	POWER Indicator	HB-4778	P-710077D
27	FM Indicator	HB-4775	P-710077A
28	AM Indicator	HB-4776	P-710077B
29	Short Wave Indicator	HB-4777	P-710077C
30	Selector Knob	K-2230	P-650180
31	AM/SW ANT Coil (L6, 7, 8)	CA-3614	P-110060
32	Antenna Holder		P-610395
33	Shaft B for Pulley	D-3203	P-420234
34	TUNING Holder	HB-4774	P-410878
35	Spacer		P-420236
36	FINE TUNING	D-3201	P-150022
37	Printed Circuit Board		P-200310
38	Large Pulley 76	D-0359	P-430031
39	Battery Cover	DB-0158	P-600094
40	Battery Cushion		P-820322
41	Rod Antenna	A-0295	P-330018
42	AC Line Cord	W-1584	P-310024

REF. NO.	DESCRIPTION	RS PART NO.	MFR'S PART NO.
CERAMIC FILTER			
CF1	Ceramic Filter CFS 10.7M		P-140017
DIODES			
D1	Varicap Diode 1S2687		
D2	Silicon Diode WG-713		
D3	Diode 1N60		
D4	Diode 1N60		
D5	Diode 1N60P		
D6	Diode 1N60P		
D7	Silicon Rectifier SR-1K or 10D-1 or SU-1		
D8	Silicon Rectifier SR-1K or 10D-1 or SU-1		
D9	Silicon Rectifier SR-1K or 10D-1 or SU-1		
D10	Silicon Diode WG-713		
D11	Zener Diode WZ-065		
D12	Silicon Diode WG-713		
INTEGRATED CIRCUIT			
IC1	LA1201		
IC2	LA4100 or LA4101		
COILS			
L1	FM Filter Coil HR5-14½TI	CA-3369	P-340030
L2	FM ANT Coil HL5-3½ TI	CA-3600	P-340020
L3	FM RF Coil HR4-4½ TI	CA-4727	P-340047
L4	FM Trap Coil VL4-14½TI	CA-3574	P-340018
L5	FM OSC Coil HL6-2½TII	CA-4729	P-340051
L6	AM ANT Coil 10ϕ X 120	CA-3614	P-110060
L7	AM ANT Coil 10ϕ X 120	CA-3614	P-110060
L8	AM ANT Coil 10ϕ X 120	CA-3614	P-110060
L9	ANT Coil (AC-018)	CA-2902	P-110018
L10	AM OSC Coil OC-016	CA-4331	P-120016
L11	SW OSC Coil OC-059	CA-4739	P-120059
L12	OSC Coil (OC-018)	CA-4438	P-120018
L13	AM IF Coil 10A-043	CA-3601	P-130043
L14	Ferrite Inductor 0.68μH	CA-2903	P-360010
L15	Ferrite Inductor 0.92μH		P-360028
TRANSISTORS			
Q1	Transistor 2SC 668 (C)		
Q2	Transistor 2SC 930 (C) or 2SC 668 (C)		
Q3	Transistor 2SC 668 (C)		
Q4	Transistor 2SC 930 (D)		
Q5	Transistor 2SC1317 (Q, R)		

REF. NO.	DESCRIPTION	RS PART NO.	MFR'S PART NO.
C47	Electrolytic 10μF/16 V		
C48	Mylar 0.047μF ± 20% 50 WV		
C49	Electrolytic 3.3μF/16 V		
C50	Ceramic 0.01μF 25 WV		
C51	Ceramic 0.01μF 25 WV		
C52	Mylar 0.022μF ± 20% 50 WV		
C53	Mylar 0.1μF ± 20% 50 WV		
C54	Ceramic 220 pF ± 10% 50 WV		
C55	Mylar 0.047μF ± 20% 50 WV		
C56	Ceramic 2 pF ± 0.5 pF 50 WV		
C57	Ceramic 0.02μF 25 WV		
C58	Ceramic 0.02μF 25 WV		
C59	Ceramic 0.02μF 25 WV		
C60	Electrolytic 4.7μF/16 V		
C61	Mylar 0.1μF ± 20% 50 WV		
C62	Mylar 0.047μF ± 20% 50 WV		
C63	Electrolytic 3.3μF/16 V		
C64	Mylar 0.0047μF ± 20% 50 WV		
C65	Ceramic 0.001μF 50 WV		
C66	Ceramic 0.001μF 50 WV		
C67	Ceramic 70 pF ± 10% 50 WV		
C68	Ceramic 0.001μF 50 WV		
C69	Electrolytic 100μF/6.3 V		
C70	Electrolytic 220μF/10 V		
C71	Electrolytic 470μF/10 V		
C72	Ceramic 50 pF ± 10% 50 WV		
C73	Mylar 0.22μF ± 20% 50 WV		
C74	Electrolytic 47μF/10 V		
C75	Electrolytic 220μF/6.3 V		
C76	Electrolytic 220μF/6.3 V		
C77	Electrolytic 33μF/10 V		
C78	Electrolytic 220μF/10 V		
C79	Ceramic 0.02μF 25 WV		
C80	Electrolytic 220μF/10 V		
C81	Ceramic 30 pF ± 10% 50 WV		
C82	Not used		
C83	Mylar 0.047μF ± 20% 50 WV		

BOTTOM VIEW



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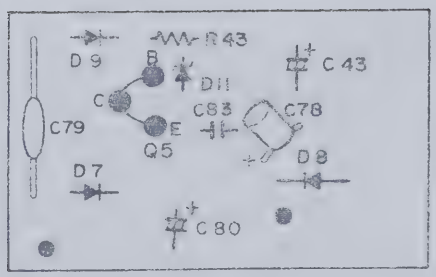
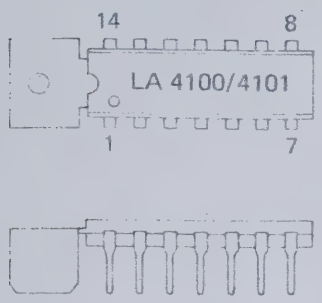
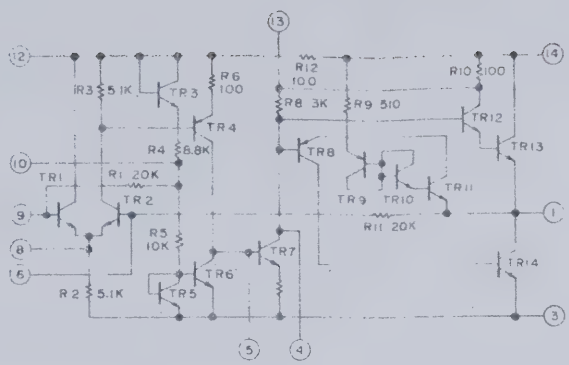
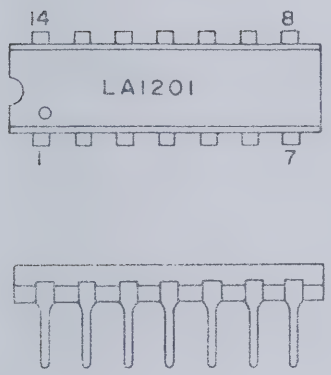
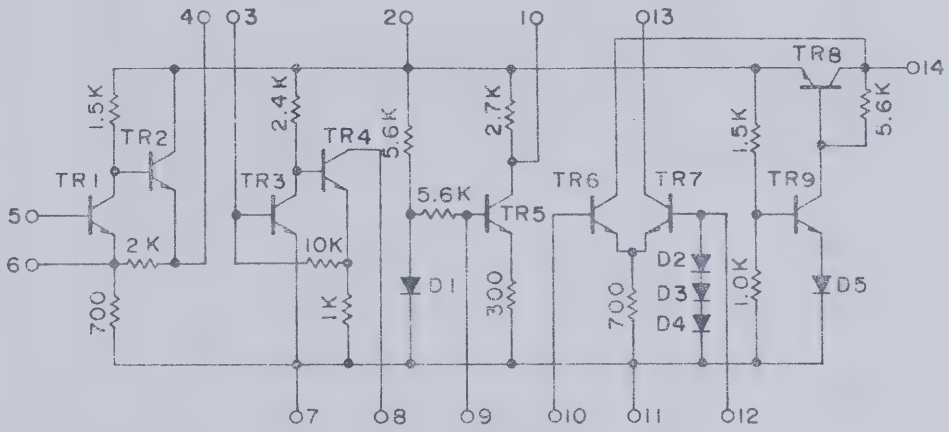


IC INTERNAL CONNECTION

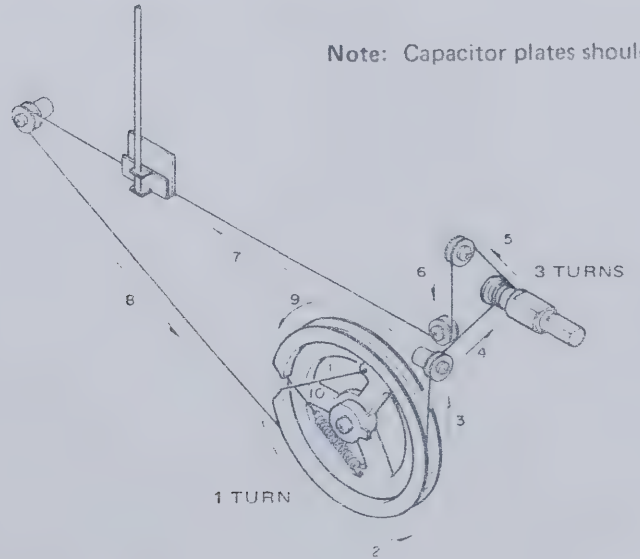








8. DIAL STRINGING DIAGRAM



Note: Capacitor plates should be closed.

6. TROUBLE SHOOTING CHART

SYMPTOM	CAUSE/REMEDY
1) No output	A) Faulty AC power cord: * Replace the cord. B) Broken wire in the Battery Case: * Repair or replace. C) Open power transformer: * Replace the transformer. D) Defect in the power switch: * Replace the switch. E) Battery polarity is wrong: * Correct battery. F) Weak battery: * Replace. G) D7/9 Rectifier defective: * Replace. H) Defective Q5 or D11 circuity: * Replace defective component(s). I) HEADPHONE JACK is defective: * Repair or replace. J) Speaker voice coil is broken: * Replace. K) Defective IC: * Replace defective IC. L) Defect in VOLUME Control: * Replace it. M) Defective IC: * Replace defective IC.
2) No AM	A) Poor contact selector switch: * Repair or replace switch. B) Transistor, diode, IFT, IC, resistor, coil or capacitor in AM IF circuit defective: * Replace the defective component(s). C) Bar Antenna coil defective: * Repair or replace.
3) No FM	A) Poor contact selector switch: * Repair or replace switch. B) Transistor, diode, IFT, IC, coil, resistor or capacitor in FM IF circuit defective: * Replace the defective component(s). C) Poor contact in ANT lead: * Repair as required.
4) No SW1	A) Poor contact selector switch: * Repair or replace switch. B) Transistor, diode, IFT, IC, resistor, coil or capacitor in AM IF circuit defective: * Replace the defective component(s). C) Bar Antenna coil defective: * Repair or replace.
5) No SW2	A) Poor contact selector switch: * Repair or replace switch. B) Transistor, diode, IFT, IC, coil, resistor or capacitor in AM IF circuit defective: * Replace the defective component(s). C) Poor contact in ANT lead: * Repair as required.

SW 1 ALIGNMENT

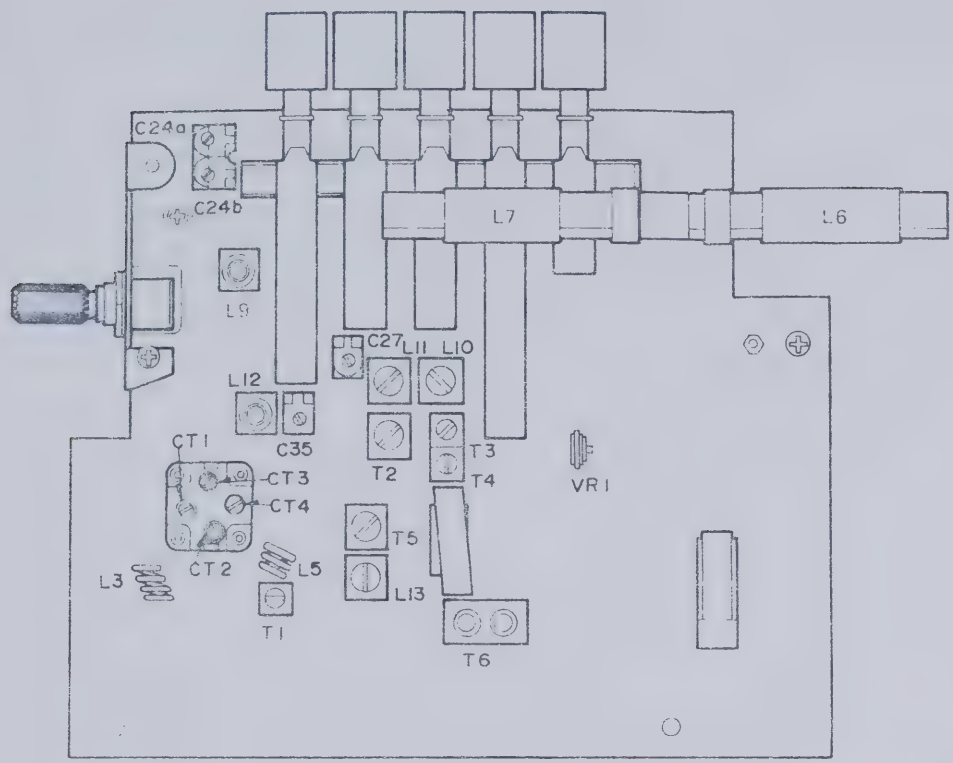
Alignment	Equipment	Connection	Step	Gen. Freq.	Dial Setting	Adjustment	For
TUNING RANGE	AM Signal Generator VTVM	See Figure 6.	1	3.8 MHz	Minimum Frequency	L11 OSC Coil	Maximum Output
			2	12.5 MHz	Maximum Frequency	C27	Maximum Output
			3	Repeat steps 1 and 2 until tuning range covers exactly from 3.8 MHz to 12.5 MHz.			
TRACKING	AM Signal Generator VTVM	See Figure 6.	1	4.2 MHz	Tune to Signal.	L7 Antenna Coil	Maximum Output
			2	9 MHz	Tune to Signal.	C24A	Maximum Output
			3	Repeat steps 1 and 2 until no further improvement can be made.			

SW 2 ALIGNMENT

Alignment	Equipment	Connection	Step	Gen. Freq.	Dial Setting	Adjustment	For
TUNING RANGE	AM Signal Generator VTVM	See Figure 7.	1	11.3 MHz	Minimum Frequency	L12 OSC Coil	Maximum Output
			2	22.8 MHz	Maximum Frequency	C35	Maximum Output
			3	Repeat steps 1 and 2 until tuning range covers exactly from 11.3 MHz to 22.8 MHz.			
TRACKING	AM Signal Generator VTVM	See Figure 7.	1	13 MHz	Tune to Signal.	L9 Antenna Coil	Maximum Output
			2	20 MHz	Tune to Signal.	C24B	Maximum Output
			3	Repeat steps 1 and 2 until no further improvement can be made.			

4. ALIGNMENT INSTRUCTIONS

ALIGNMENT POINTS LOCATION



LIST OF TEST EQUIPMENT

1. DC Volt Meter (above 50 KΩ/V)
2. AM Signal Generator
3. Vacuum Tube Volt Meter
4. IF Sweep Generator
5. FM Signal Generator
6. Oscilloscope

GENERAL PREPARATION

- Check source voltage.
- Set function switch to band being aligned.
- FM and SW1, SW2 telescopic antennas should be disconnected.
- Signal input should be kept as low as possible to avoid AGC action.
- Standard modulation is 400 Hz 30% for AM and SW1, SW2.
- Standard modulation is 400 Hz 22.5 kHz deviation for FM.

Image rejection at 9 MHz	dB	20	16
Dial Calibration at 4 MHz	kHz		± 300
at 9 MHz	kHz		± 300

The oscillator must operate at 4.2 MHz with all supply voltages above 4 V DC; an over-voltage of 10% shall not be harmful.

SW 2 BAND

Speaker impedance: 8 ohms
Output readings are taken across a non-reactive load.
Output reference level is 50 mW total power.
The generator output shall terminate in an IRE loop and loop pointing toward rear of receiver.
Modulation: 400 Hz, 30%

	UNIT	NOMINAL	LIMIT
Frequency Range	MHz	11 – 22.8	12 – 22
IF	kHz	455	± 5
Sensitivity for 50 mW output, S/N 6 dB			
at 13 MHz	μV	7	20
at 16 MHz	μV	7	20
at 20 MHz	μV	7	20
Sensitivity for 20 dB S/N			
at 13 MHz	μV	20	40
at 16 MHz	μV	20	40
at 20 MHz	μV	20	40
Image rejection at 20 MHz	dB	10	4.5
Dial Calibration at 12 MHz	kHz		± 500
at 20 MHz	kHz		± 500

The oscillator must operate at 13 MHz, with all supply voltages above 4 V DC; an over-voltage of 10% shall not be harmful.

Section 9
Special Tools, Fixtures and Equipment

A. GENERAL

The Digital Indicator may be serviced and maintained using standard tools (non-magnetized) and test equipment.

B. TARGET SIMULATOR

The target simulator shown in Figure 9-1 may be constructed and used in place of the Data Pulse Generator shown in the Digital Indicator Bench Test Setup, Figure 2-2.

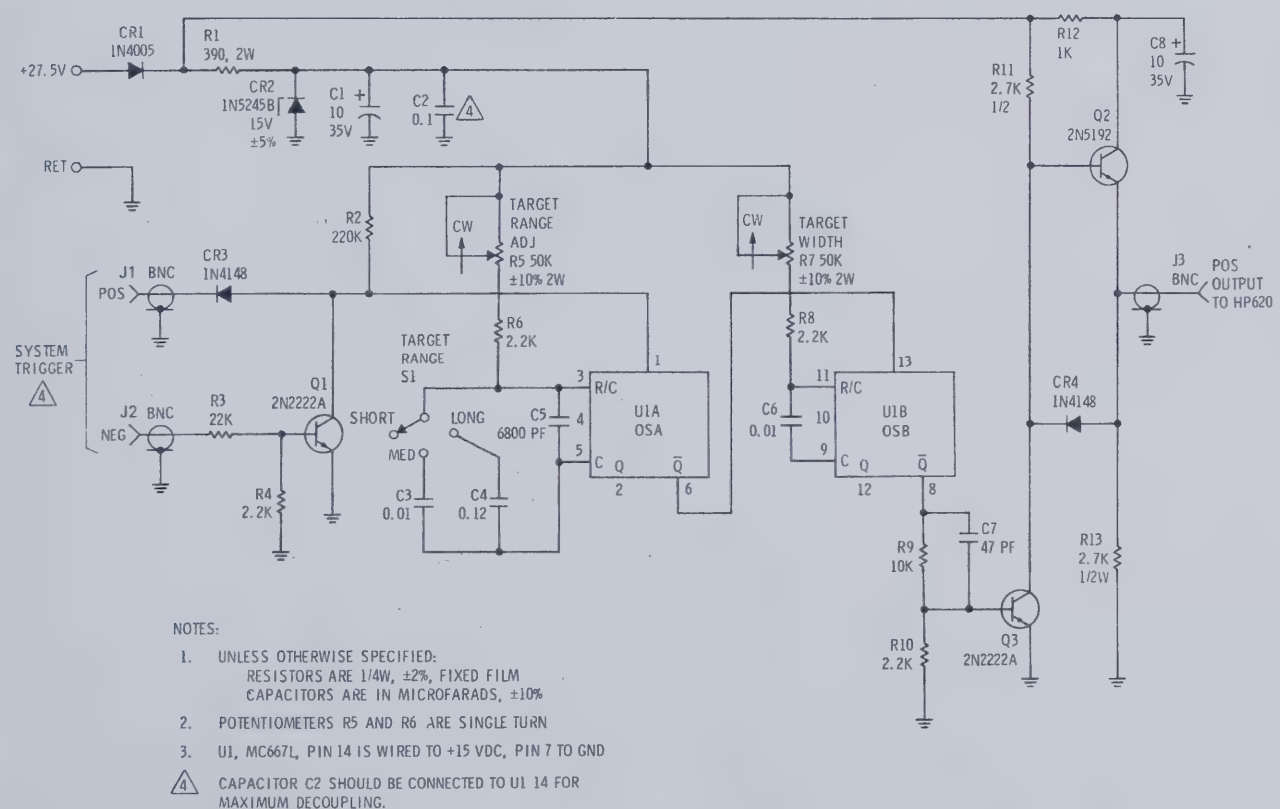
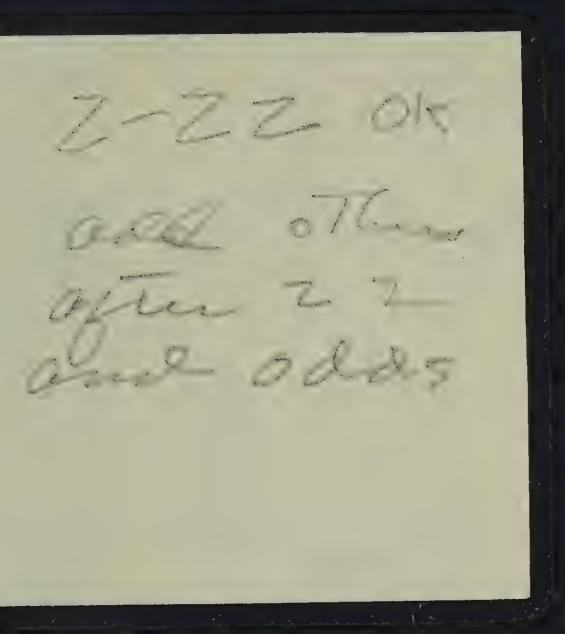


Figure 9-1. Target Simulator


2-22 ok
add other
after 27
and odds

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FM BAND

Speaker impedance: 8 ohms
Use resistive load.
Reference output level: 50 mW
Signal generator impedance: 75 ohms
Disconnect telescopic antenna cable.
The signal voltage in this specification or test data is the voltage appearing across the tuner input terminals.
Modulation: 400 Hz, 22.5 kHz deviation

	UNIT	NOMINAL	LIMIT
Frequency Range	MHz	87.5 – 108.5	88 – 108
IF	MHz	10.7	
Sensitivity for 50 mW output			
at 90 MHz	μV	5	10
at 98 MHz	μV	5	10
at 106 MHz	μV	5	10
Sensitivity for 30 dB S/N			
at 90 MHz	μV	7	13
at 98 MHz	μV	7	13
at 106 MHz	μV	7	13
FM Limiting, 3 dB, 22.5 kHz dev.	μV	15	50
IF rejection at 90 MHz, 75 kHz dev.	dB	60	45
Image rejection at 106 MHz S/N 20 dB, 22.5 kHz dev.	dB	30	20
Audio fidelity with tone in high position, 22.5 kHz dev., 1 kHz = 0 dB	Hz	50 – 4000	100 – 3000
ACA 100 μV ± 400 kHz, 75 kHz dev.	dB	15	10
Audio THD, 400 Hz, 75 kHz dev. (1000 μV)	%	1.5	5
Lowest Battery Voltage for operation	V		4
Dial Calibration at 88 MHz	kHz		± 700
at 108 MHz	kHz		± 700
at 100 MHz	kHz		± 700

SW 1 BAND

Speaker impedance: 8 ohms
Output readings are taken across a non-reactive load.
Output reference level is 50 mW total power.
The generator output shall terminate in an IRE loop and loop pointing toward rear of receiver.
Modulation: 400 Hz, 30%

	UNIT	NOMINAL	LIMIT
Frequency Range	MHz	3.8 – 12.5	4 – 12
IF	kHz	455	± 5
Sensitivity for 50 mW output, S/N 6 dB			
at 4.2 MHz	μV	100	150
at 6 MHz	μV	100	150
at 9 MHz	μV	100	150
Sensitivity for 20 dB S/N			
at 4.2 MHz	μV	200	400
at 6 MHz	μV	200	400
at 9 MHz	μV	200	400

Image rejection at 9 MHz	dB	20	16
Dial Calibration at 4 MHz	kHz		± 300
at 9 MHz	kHz		± 300

The oscillator must operate at 4.2 MHz with all supply voltages above 4 V DC; an over-voltage of 10% shall not be harmful.

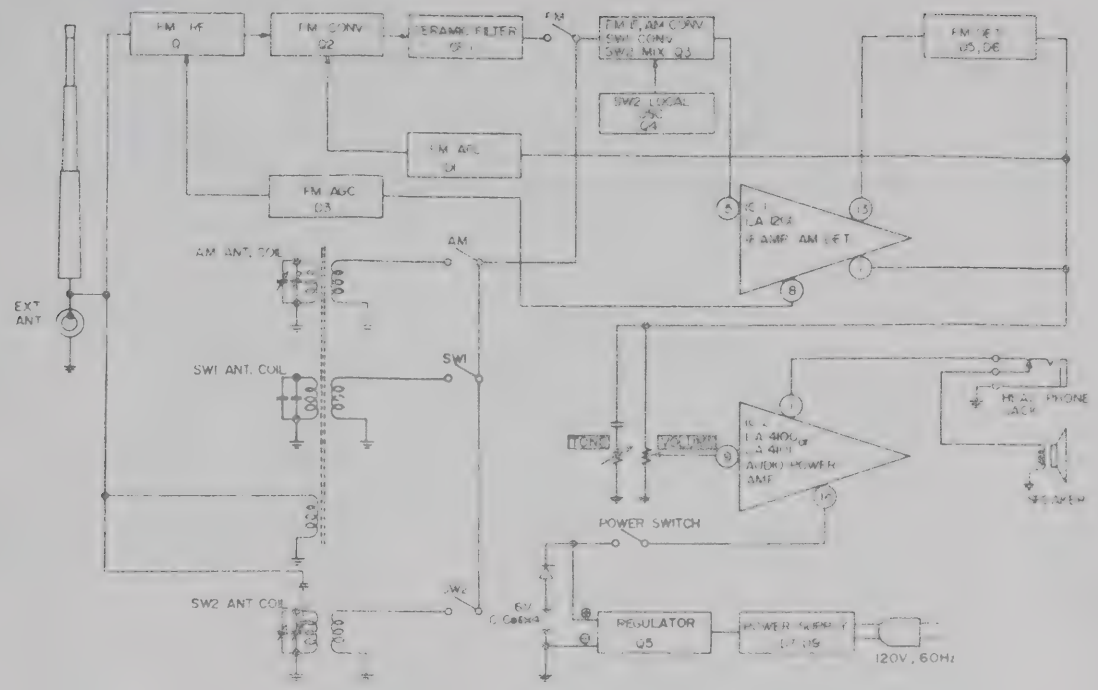
SW 2 BAND

Speaker impedance: 8 ohms
Output readings are taken across a non-reactive load.
Output reference level is 50 mW total power.
The generator output shall terminate in an IRE loop and loop pointing toward rear of receiver.
Modulation: 400 Hz, 30%

	UNIT	NOMINAL	LIMIT
Frequency Range	MHz	11 – 22.8	12 – 22
IF	kHz	455	± 5
Sensitivity for 50 mW output, S/N 6 dB			
at 13 MHz	μV	7	20
at 16 MHz	μV	7	20
at 20 MHz	μV	7	20
Sensitivity for 20 dB S/N			
at 13 MHz	μV	20	40
at 16 MHz	μV	20	40
at 20 MHz	μV	20	40
Image rejection at 20 MHz	dB	10	4.5
Dial Calibration at 12 MHz	kHz		± 500
at 20 MHz	kHz		± 500

The oscillator must operate at 13 MHz, with all supply voltages above 4 V DC; an over-voltage of 10% shall not be harmful.

2. BLOCK DIAGRAM



3. DISASSEMBLY INSTRUCTIONS

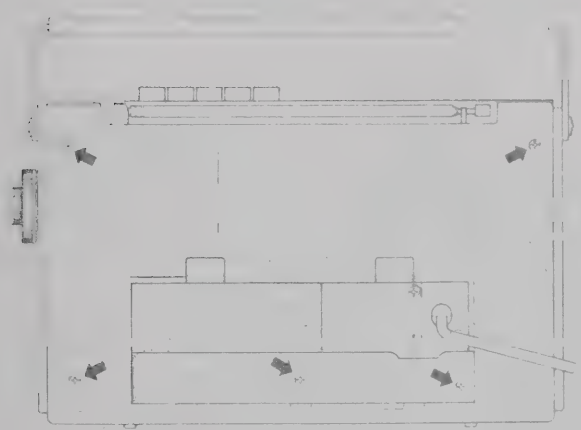


Figure A

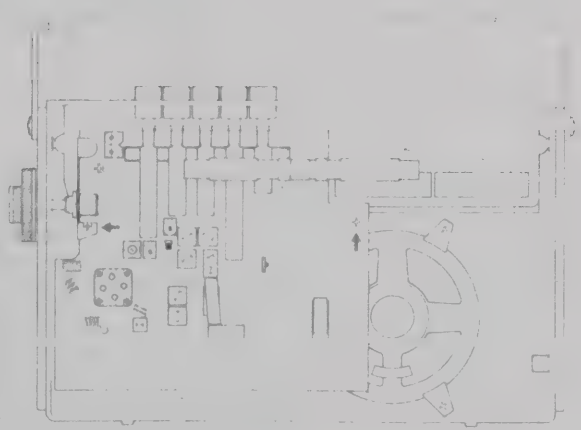


Figure B

NOTE:
- To remove rear cabinet, remove the 5 screws (indicated by arrow marks) from the rear (Figure A).
- Pull off TUNING, FINE TUNING, VOLUME and TONE knobs.
- Remove the antenna and Battery leads.
- Remove the 2 screws from the P.C.B. shown in Figure B.
- Carefully remove the P.C.B. from the cabinet.

IC 1 BIAS ALIGNMENT

Alignment	Equipment	Connection	Step	Gen. Freq.	Dial Setting	Adjustment	For
IC 1 BIAS	DC Volt Meter (above 50 kΩ/V)	See Figure 1.			Maximum Frequency	VR 1	Adjust for 0.5V between 4-6 terminal.

AM ALIGNMENT

Alignment	Equipment	Connection	Step	Gen. Freq.	Dial Setting	Adjustment	For
IF	AM Signal Generator VTVM	See Figure 2.		455 kHz	Maximum Frequency	T3, T4, L13	Maximum Output
TUNING RANGE	AM Signal Generator VTVM	See Figure 3.	1	510 kHz	Minimum Frequency	L10 OSC Coil	Maximum Output
			2	1650 kHz	Maximum Frequency	CT4	Maximum Output
			3	Repeat steps 1 and 2 until tuning range covers exactly from 510 kHz to 1650 kHz.			
TRACKING	AM Signal Generator VTVM	See Figure 3.	1	600 kHz	Tune to Signal.	L6 Antenna Coil	Maximum Output
			2	1400 kHz	Tune to Signal.	CT3	Maximum Output
			3	Repeat steps 1 and 2 until no further improvement can be made.			

FM ALIGNMENT

Alignment	Equipment	Connection	Step	Gen. Freq.	Dial Setting	Adjustment	For
IF	IF Sweep Generator, Oscilloscope	See Figure 4.		10.7 MHz	Maximum Frequency	T1, T2 T5, T6	Symmetrical S-Curve On Scope
TUNING RANGE	FM Signal Generator VTVM	See Figure 5.	1	88 MHz	88 MHz	L5 (Stretch or Squeeze)	Maximum Output
			2	108 MHz	108 MHz	CT2	Maximum Output
			3	Repeat steps 1 and 2 until tuning range covers exactly from 88 MHz to 108 MHz.			
TRACKING	FM Signal Generator VTVM	See Figure 5.	1	90 MHz	Tune to Signal.	L3 (Stretch or Squeeze)	Maximum Output
			2	106 MHz	Tune to Signal.	CT1	Maximum Output
			3	Repeat steps 1 to 3 until no further improvement can be made.			

5. EQUIPMENT CONNECTIONS

INTEGRATED CIRCUIT BIAS

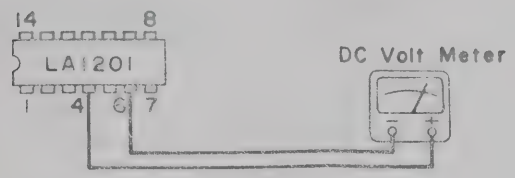


FIGURE 1

AM IF

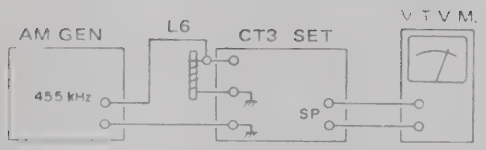


FIGURE 2

AM BAND/TRACKING

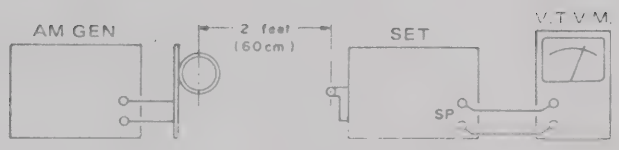


FIGURE 3

FM IF

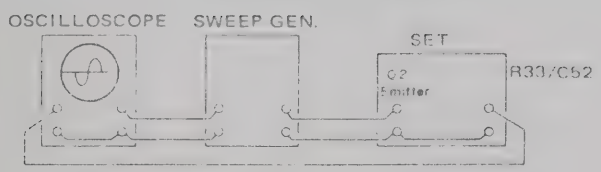


FIGURE 4

FM BAND/TRACKING

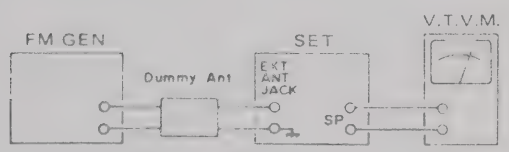


FIGURE 5

SW 1 BAND TRACKING

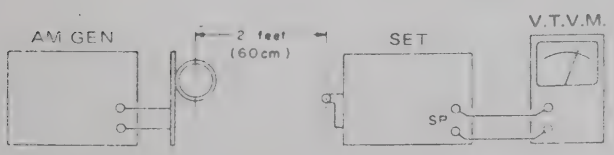


FIGURE 6

SW 2 BAND TRACKING

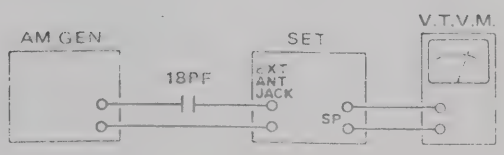


FIGURE 7

SYMPTOM	CAUSE/REMEDY
6) No effect at full length of rod Antenna on FM, SW1, SW2	A) Poor contact of band selector switch and rod Antenna: * Repair or replace. B) Broken wire between band selector switch and rod antenna: * Repair or replace.
7) No effect when connecting EXT. ANT.	A) Poor contact on jack for EXT. ANT. or defective jack: * Repair or replace.
8) HEADPHONE jack does not function.	A) Poor contact on HEADPHONE jack or defective: * Repair or replace.
9) TONE does not work.	A) VR3 control defective: * Replace. B) Defective C62: * Replace.
10) Distortion	A) Power voltage is lower than required: * Replace battery.

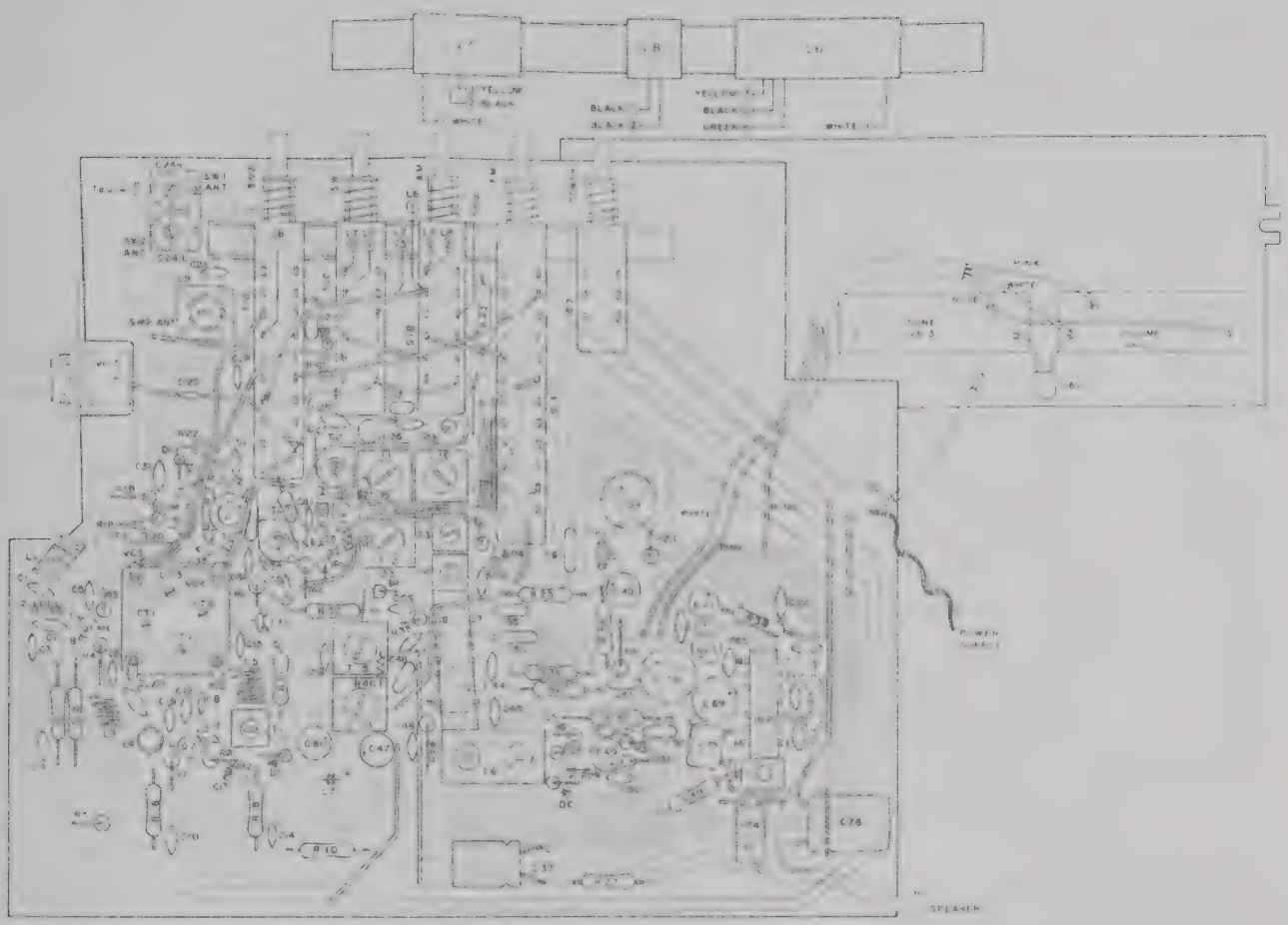
7. IC & TRANSISTOR LEAD IDENTIFICATIONS

2SC 1317

2SC 668, 2SC 930

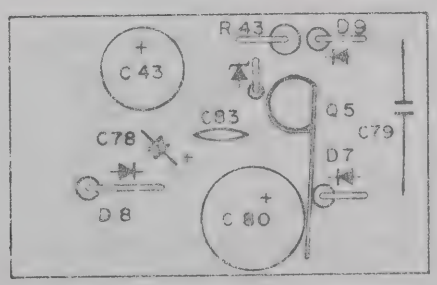
9. PRINTED CIRCUIT BOARD

TOP VIEW



10. POWER SUPPLY PRINTED CIRCUIT BOARD

TOP VIEW



11. ELECTRICAL PARTS LIST

REF. NO.	DESCRIPTION	RS PART NO.	MFR'S PART NO.
CAPACITORS			
C1	Ceramic 7 pF ± 0.5 pF 50 WV		
C2	Ceramic 20 pF ± 10% 50 WV		
C3	Ceramic 30 pF ± 10% 50 WV		
C4	Ceramic 0.02μF 25 WV		
C5	Ceramic 0.02μF 25 WV		
C6	Ceramic 20 pF ± 10% 50 WV		
C7	Ceramic 4 pF ± 0.5 pF 50 WV		
C8	Ceramic 40 pF ± 10% 50 WV		
C9	Ceramic 470 pF ± 10% 50 WV		
C10	Ceramic 0.02μF 25 WV		
C11	Ceramic 5 pF ± 0.5 pF 50 WV (NPO)		
C12	Ceramic 0.01μF 25 WV		
C13	Ceramic 3 pF ± 0.5 pF 50 WV (NPO)		
C14	Ceramic 0.01μF 25 WV		
C15	Ceramic 12 pF ± 0.5 pF 50 WV (NPO)		
C16	Ceramic 0.02μF 25 WV		
C17	Mylar 0.01μF ± 20% 50 WV		
C18	Not used		
C19	Ceramic 3 pF ± 0.5 pF 50 WV (NPO)		
C20	Polystyrene 240 pF ± 5% 35 WV		
C21	Not used		
C22	Not used		
C23	Ceramic 20 pF ± 10% 50 WV		
C24A·B	Trimmer 15 pF	CA-0195	P-160005
C25	Ceramic 0.002μF 50 WV		
C26	Polystyrene 2000 pF ± 5% 35 WV		
C27	Trimmer 15 pF	CA-0194	P-160004
C28	Ceramic 55 pF ± 10% 50 WV		
C29	Ceramic 12 pF ± 0.5 pF 50 WV (NPO)		
C30	Not used		
C31	Ceramic 0.02μF 25 WV		
C32	Not used		
C33	Ceramic 680 pF ± 10% 50 WV		
C34	Ceramic 65 pF ± 10% 50 WV (NPO)		
C35	Trimmer 15 pF	CA-0194	P-160004
C36	Ceramic 0.02μF 25 WV		
C37	Electrolytic 100μF/6.3 V		
C38	Not used		
C39	Electrolytic 100μF/6.3 V		
C40	Ceramic 0.04μF 25 WV		
C41	Mylar 0.01μF ± 20% 50 WV		
C42	Electrolytic 10μF/16 V		
C43	Electrolytic 100μF/10 V		
C44	Ceramic 0.02μF 25 WV		
C45	Mylar 0.01μF ± 20% 50 WV		
C46	Ceramic 0.04μF 25 WV		

REF. NO.	DESCRIPTION	RS PART NO.	MFR'S PART NO.
RESISTORS			
R1	Carbon PZ 330 ohm ¼ W		
R2	Carbon PZ 1K ohm ¼ W		
R3	Carbon UZ 180K ohm ¼ W		
R4	Carbon UZ 150 ohm ¼ W		
R5	Carbon UZ 47 ohm ¼ W		
R6	Carbon PZ 2.2K ohm ¼ W		
R7	Carbon UZ 150K ohm ¼ W		
R8	Carbon UZ 100 ohm ¼ W		
R9	Carbon PZ 100K ohm ¼ W		
R10	Carbon PZ 470K ohm ¼ W		
R11	Carbon PZ 270 ohm ¼ W		
R12	Carbon UZ 330 ohm ¼ W		
R13	Carbon UZ 270K ohm ¼ W		
R14	Carbon UZ 2.2K ohm ¼ W		
R15	Carbon PZ 0–47 ohm ¼ W		
R16	Carbon PZ 2.2K ohm ¼ W		
R17	Carbon UZ 0~1K ohm ¼ W		
R18	Carbon UZ 68K ohm ¼ W		
R19	Carbon UZ 47K ohm ¼ W		
R20	Carbon PZ 1.8K ohm ¼ W		
R21	Carbon UZ 680 ohm ¼ W		
R22	Carbon UZ 2.2K ohm ¼ W		
R23	Carbon PZ 22 ohm ¼ W		
R24	Carbon PZ 22 ohm ¼ W		
R25	Carbon PZ 4.7K ohm ¼ W		
R26	Carbon PZ 10K ohm ¼ W		
R27	Carbon PZ 680 ohm ¼ W		
R28	Carbon UZ 560 ohm ¼ W		
R29	Carbon UZ 1K ohm ¼ W		
R30	Carbon UZ 10K ohm ¼ W		
R31	Carbon UZ 10K ohm ¼ W		
R32	Carbon UZ 1K ohm ¼ W		
R33	Carbon PZ 33 ohm ¼ W		
R34	Carbon PZ 2.2K ohm ¼ W		
R35	Carbon UZ 330 ohm ¼ W		
R36	Carbon PZ 22K ohm ¼ W		
R37	Carbon PZ 2.2K ohm ¼ W		
R38	Carbon PZ 68~150 ohm ¼ W		
R39	Carbon PZ 47 ohm ¼ W		
R40	Carbon PZ 2.2M ohm ½ W		
R41	Carbon UZ 10K ohm ¼ W		
R42	Carbon PZ 1.2M ohm ½ W		
R43	Carbon PZ 560 ohm ½ W		
R44	Not used		
R45	Carbon PZ 22 ohm ¼ W		
R46	Carbon PZ 10K~∞ ohm ¼ W		

REF. NO.	DESCRIPTION	RS PART NO.	MFR'S PART NO.
SPEAKER			
SPKR	Speaker 8 ohms		P-270046
SWITCHES			
S1A-D	Band Selector Switch	S-7274	P-180205
S2	Power Switch	S-7274	P-180205
TRANSFORMERS			
T1	FM IFT (7F-013)	CA-7253	P-140013
T2	FM IFT (10F-011)	CA-7254	P-140011
T3	AM IFT (7A-041)	CA-7604	P-130041
T4	AM IFT (7A-042)	CA-7605	P-130042
T5	FM IFT (10F-011)	CA-7254	P-140011
T6	FM IFT (10F-019)	CA-7517	P-140019
T7	Power Transformer UL/CSA	TA-0569	P-100393
T7	Power Transformer (For Australia)		P-100405
T7	Power Transformer (For Europe)		P-100401
VARIABLE RESISTORS			
VR1	Semi-Fixed 50KB	P-6534	P-170177
VR2	VOLUME 10KD	P-1678	P-170224
VR3	TONE 20KB		P-170225
VARIABLE CAPACITORS			
VC1–VC4	Poly-Variable Capacitor 266PX2, 20PX2	C-4574	P-150021
VC5	Fine Tuning	D-3201	P-150022
PRINTED CIRCUIT BOARD			
P.C.B.	Printed Circuit Board		P-200310
P.C.B.	Power Supply Board		P-200311

REF. NO.	DESCRIPTION	RS PART NO.	MFR'S PART NO.
43	Cord Stopper		P-480010
44	Rear Cabinet	DB-0158	P-600094
45	Battery Contact	HB-2408	P-410617
46	EXT ANT Jack	J-0751	P-190068
47	POWER Supply P.C.B.		P-200311
48	POWER Transformer	TA-0569	P-100393
49	Stopper Bracket		P-410877
50	Battery Spring		P-440068
51	Lug Terminal		P-320088
52	FINE TUNING Knob	K-2239	P-650182
53	TUNING Knob	K-2238	P-650179
54	Side Panel (R)	Z-2843	P-710076
55	Handle Stopper	HB-4784	P-410875
56	Spring (FINE TUNING Knob Ass'y)		P-440102
57	Spring (TUNING Knob Ass'y)		P-440090
58	Spring		P-440094
59	Dial String Spring		P-440075
60	Antenna Washer		P-410985
61	Dial String		